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MILITARY REVIEW

COMMAND AND GENERAL STAFF SCHOOL
Published at Fort Leavenworth, Kansas

MONTHLY REVIEW OF
MILITARY LITERATURE

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COMMAND AND GENERAL STAFF SCHOOL
MILITARY REVIEW
FORT LEAVENWORTH, KANSAS

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The Editor

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Number 4

COMMAND AND GENERAL STAFF SCHOOL

MILITARY REVIEW

MONTHLY REVIEW OF MILITARY LITERATURE



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July 1943



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GENERAL GEORGE C. MARSHALL	<i>A.E.F. General Staff, World War I</i>
COLONEL W. H. HARDY	<i>The Air Support Command</i>
COLONEL J. F. HOWELL	<i>Development of Combat Intelligence</i>
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A.E.F. General Staff, World War I

Extracts from a lecture delivered by Major George C. Marshall, Jr., Infantry, on 19 September 1922 at the Army War College, Washington, D. C. Major Marshall is now General Marshall, Chief of Staff, U.S. Army.

THE BULK of our General Staff officers with the field forces in France were suddenly thrown into the great St. Mihiel and Meuse-Argonne operations for their first battle experience. Many had no previous practical experience, and most had but three months' instruction at Langres. Under the circumstances they rose to their great responsibilities in an admirable manner, but their lack of adequate training and experience, together with their sudden immersion in a tremendous and prolonged conflict, developed weaknesses which intimately affected the troops, and therefore seem worthy of comment.

A certain, and not inconsiderable, number of officers became depressed or seriously irritated by the frequent necessity of carrying through plans which did not fully meet their approval. This state of mind directly and adversely affected the efficiency of their work, to the manifest disadvantage of the troops. In some instances this condition had a marked effect on the operations of the units concerned. The half-hearted and pessimistic feelings of the General Staff officers was reflected throughout the command.

Another phase was the disorganizing and disheartening effect on some staff officers of frequent changes in orders. Just as they would complete the preparation of the necessary plans and orders for carrying into effect instructions from some higher command, a change of plan would be announced, and this procedure might be repeated several times. I knew from personal experience of instructions being changed five times, each occasion demanding a material readjustment of orders already issued. Many officers broke under the strain of these conditions, losing confidence in those above them and developing a highly irritable and nervous mental state. They then ceased to operate efficiently.

Other General Staff officers exhibited that lack of intimate personal knowledge of the marching, billeting, and fighting of the troops which makes it impossible to prepare orders and instructions without causing complications, unnecessary hardships, and unfavorable battle conditions for the combat

organizations. Failure to recognize the time element required for the study and preparation of orders and their transmission through the successive echelons down to the corporal's squad, was the most serious failing of many of our most hastily trained General Staff officers. They frequently *themselves* absorbed all the available time in the preparation of orders, which could not and did not reach the troops in time for execution.

Under the circumstances the latter did the best they could. Too frequently the regimental, battalion, and company officers had to exhaust and dangerously expose themselves in striving to communicate delayed instructions to the troops. Poorly coordinated and partially understood operations would result. In the records of the Historical Branch, what may appear to be a model order is often the worst example, having required so much time in preparation that its directions never reached the fighting battalions.

These failings and deficiencies were inevitable, and I doubt if any group of officers similarly placed and without the resourceful and independent characteristics of the American, could have approximated the splendid service our men rendered.

From all this it would seem, however, that to be an efficient General Staff officer with combat forces, a man must possess in addition to specific General Staff training, certain personal characteristics, and an intimate knowledge of the troops he serves.

He must be able, enthusiastically, loyally, and energetically to carry through orders and instructions which do not meet his approval fifty per cent of the time.

He must understand that in large operations frequent changes in orders is the normal and unavoidable condition, and must be accepted with equanimity. He must be ever conscious of the vital time factor and must govern his work accordingly.

And he must know by actual experience (not by mere observation) how the troops live, march, and fight.

G-2 Says—"I Don't Know"

LIEUTENANT COLONEL S. L. PEEBLES, *Infantry*
Instructor, Command and General Staff School

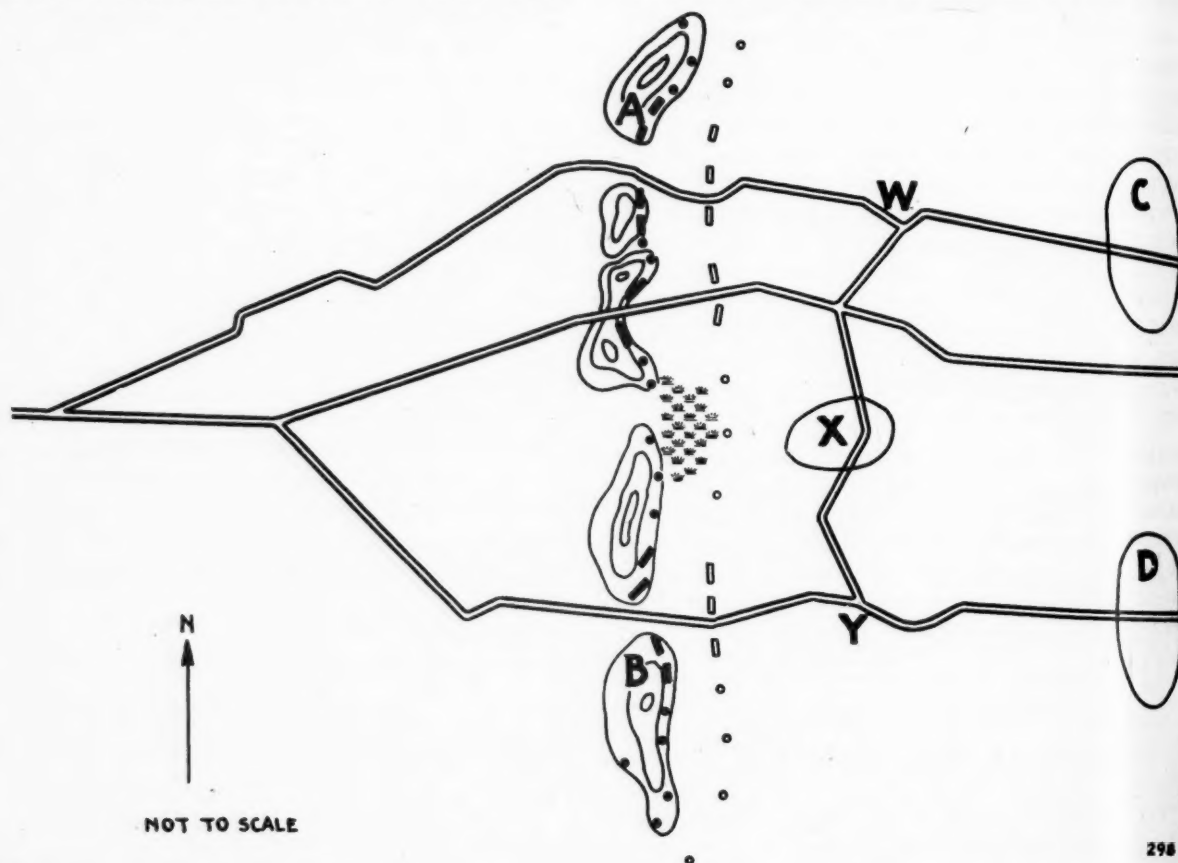
THE PURPOSE of this article is to discuss the context and method of presenting a G-2 Estimate of the Enemy Situation. Since the form for this estimate may be found on page 26 of Field Manual 30-5 or page 91 of Field Manual 101-5, and since the reader may be assumed to be familiar with this form along with all the other forms in our Field Manuals, there appears no good reason for entering into an abstract study of the G-2 Estimate as applied to a form. Let us instead get out into the field with the 200th Infantry Division, which we hope will some day exist, and visit with the Division Commander, Major General Iwan D. Fax who could very well exist, his general staff and particularly his G-2, Lieutenant Colonel Iva Q'Rosity, the like of whom there should be more.

Colonel Q'Rosity is exceptional in many ways, as this story will prove, for he has been with the division staff since it received its pre-natal instruction at Fort Leavenworth, assisted materially during the labor pain period prior to D-Day, was there when the division was born, and has been actively engaged in helping to raise his division into a lusty,

hard hitting combat outfit during the basic, unit, and combined training phases. He knows the capabilities and limitations of all the units and he himself is well known and respected.

The division is just entering into large-scale field maneuvers for the first time under General Fax, who has recently assumed command. The staff knows little about him except that he has a strong personality, is very forceful, and has stated that he wants everyone to make a good showing in the maneuvers. He has not had time to form any definite conclusion about his staff, but they appear to be somewhat youthful, and he has his doubts about their ability to do the detailed planning to put into execution some of the tactical operations he hopes to execute.

Opportunity to prove its efficiency came early, and the division was given the mission to advance on a broad front, push back the Red covering forces, seize the line A-B, and cover the concentration of the Blue Corps. This operation was executed with such smoothness that General Fax's hopes began to rise. True, the Red forces opposing him were known to



be less trained than his division and he knew that Red reinforcements, which were being concentrated, were seasoned troops under excellent leadership. The real test was yet to come.

The corps order for continuation of the operations was accompanied by a G-2 Periodic Report, and extracts from both follow:

"Red reinforcements, including armored units, are concentrating at Areas C and D."

"It is expected that Red will assume the offensive in the direction C-A, when his concentration is complete."

"Blue corps will complete its concentration in 3 days."

"200th Inf Div will hold the enemy east of the general line A-B..."

General Fax estimated the situation, grumbled a bit about the extremely wide front he had to cover, arrived at a decision, and issued a directive which went something like this:

"This division will hold the line A-B, with two combat teams. The third combat team and the Medium Artillery Battalion will be moved to the north flank to be employed against the expected offensive from C toward A."

After issuing his directive it occurred to the division commander that he had not given his staff a chance to assist in his planning and he decided to call upon them for staff estimates, beginning with G-2. After all he had plenty of time and perhaps he could get a better idea of their abilities.

Now Lieutenant Colonel Q'Rosity had completed one of the staff courses at Leavenworth, where he had been thoroughly indoctrinated with the method of enemy capabilities, which seemed to him to be sound reasoning. This was the first time the new division commander had called upon him for any kind of an estimate, and while this request was unexpected he was not unprepared. He had been studying the known facts about the enemy, the terrain as the enemy might use it, and had come to certain conclusions.

So, on this short notice, and with a slight trembling of the knees, of which he alone was conscious, he launched forth: "General, you are familiar with the enemy situation, do you want me to outline it? [A nod from the General indicated the affirmative.] Enemy forces opposing our division along the line of contact have been identified as two infantry regiments of the 100th Red Infantry Division. The third regiment has not been identified and is believed to be located in the vicinity of X [pointing on the map]."

"Movement of Red forces by rail and motor into the vicinity of C and D [pointing] is estimated as the concentration of at least two additional infantry divisions. Tanks have been observed in both areas."

"The terrain between the present line of contact and the Red concentration areas has a limited road

net, from east to west, but there are two main roads leading west from C, while in the southern sector there is only one good road. Note the lateral road W-Y which can be utilized for shifting of Red forces. The swampy area in the middle of our sector precludes the employment of tanks there. To the north and south of that swamp the ground is favorable for armored operations.

"Red can commence moving reinforcements to the west by foot and motor at any time for attack in the direction C-A or D-B, or in both directions. If motors are available the movement can begin after dark tonight and the attack can be launched at any time after midnight. Tanks can be employed to lead or support the attack, cross country on either the north or south flank."

The General had listened carefully and apparently expected G-2 to continue. After a moment or so he said, "Is that all?"

"Yes, sir," said Q'Rosity, "that's all. I've tried to eliminate all the padding and reduce the estimate to the essential facts, and the earliest possible time the attack can be launched."

"I should say that you have succeeded in the effort to be brief, but you have failed to tell me where you think Red will make his main attack," said General Fax.

G-2 had often wondered what he would say if he ever faced such a situation as that in which he found himself, and now he was surprised that the tremor in his knees disappeared as he replied, "General, I don't know the answer to that question. Red has the capability of attacking on the north and south flanks, making his main attack on either flank, but up to the present the enemy activities and dispositions do not justify a conclusion as to which line of action he will adopt."

The division commander's face settled into somewhat grimmer lines as he said, "I know that Leavenworth in recent years has been teaching the so-called doctrine of capabilities as opposed to the method of deducing the probable enemy intention, but it seems to me that such teaching is purely academic. It may be OK in a map exercise, but here I have a job to do and if I accept your line of reasoning I'll know what the Reds are doing *after* they have done it, which is entirely too late for me. I want to dispose my forces to meet their attack quickly. A commander has to take some risks in combat and I am prepared to do so if necessary. Any further comment?"

The Colonel made a rapid estimate and decision. He probably felt that he was in up to his neck and might as well submerge completely. Very quietly and calmly he said, "Yes, sir, I appreciate the spot you are on, General, and I know that many officers consider the combat intelligence methods outlined in FM 30-5 merely a school doctrine. But actually it is War Department doctrine for the guidance of

our combat forces. I believe the method of capabilities will pay dividends if given a chance. It will be as successful as our reconnaissance. Every agency in your division is highly trained and eager to go, and the troops are intelligence conscious. I *know* because I have assisted in and supervised their training. We can get you *early* information of the movement of Red forces and I am sure that I can fix the location of their forces accurately enough so that you will have ample time to dispose our forces to meet their main attack. I believe sincerely that I can prevent your being surprised."

General Fax began to fish a cigar out of his pocket while the remainder of the staff looked at Q'Rosity with some bewilderment. He had always appeared to be a sane normal person heretofore. True, the division commander had invited comment but only a fool would have kept on talking.

When the General had his cigar going smoothly he began to say, "Colonel, you are most persuasive and sincere and apparently very sure of the proficiency of our reconnaissance agencies. If I change my mind, and I'm never afraid to do that, and decide to give your pet theory a chance, it means that I'll have to discard my announced plan and hold lightly along the present line, with a strong mobile reserve centrally located, prepared for rapid movement to either flank. And that is what I am going to do. Not because you have sold me anything, but because I'm interested in finding out how effective our intelligence and reconnaissance is. That is more important to me than outguessing the Red commander in this maneuver. Keep me advised of any major change in the situation."

G-2, with an expression on his face that might have reflected the award of a Medal of Honor, said simply, "Yes, sir."

That night in the operations tent the G-2 situation map began to build up a clear cut picture as reports and messages came in. Red forces had moved to the west in motors with the bulk of the forces along the south flank. Q'Rosity had kept G-3 informed as to the changing situation and gave him an estimate about like this:

"Joe, you know as much about the enemy situation as I do. The Red force on the south which I estimate as two infantry regiments, reinforced, and about two tank battalions can advance from its present assembly area and attack our position in vicinity of B within two hours, or about 0100.

"The force on the north, estimated as an infantry regimental combat team, with about one tank company, can attack at about the same time."

G-3, who had been wanting to say something ever

since the staff conference and hadn't known quite how to say it, now said, "Thanks a lot, old man, I'll alert the regimental commanders, and I want to say that I am glad you foresaw how this thing would develop. You were skating on mighty thin ice today and came pretty close to attempting to educate the General, which I have always understood no staff officer should try. Where are you going now?"

Q'Rosity, with justifiable confidence, said, "I'm going to see the Chief of Staff and recommend that the General be awakened to receive the same estimate I gave you. It's hot stuff. So far as educating the commander is concerned, that was farthest from my thoughts. I was trying to protect him from being surprised which I believe is the sole reason for my being. If I had failed to do so I'd be shirking my responsibility. And get this straight, I didn't foresee how the situation would develop. I didn't know and said so, don't you remember?"

"Yeah, I remember, and it takes a lot of guts for a staff officer to say, 'I don't know.'"

COMMENTS

It is hoped that the situation outlined above has illustrated the following points:

1. G-2 must be prepared to give an estimate of the enemy situation when called for.
2. He keeps brother staff officers abreast of changes in the situation and presents his estimate to them.
3. He must be experienced enough to realize when the situation becomes "hot" and take steps to advise the commander.
4. A well-kept situation map is in indispensable aid in presenting an oral estimate.
5. The G-2 estimate should be brief and concise. State the known or deduced facts about the enemy, the terrain as it affects him, and brief conclusions as to enemy capabilities. Eliminate all the padding.
6. Form for the estimate, on page 26, FM 30-5, should be so thoroughly familiar to G-2 that following it has become a habit.
7. It is the duty of a general staff officer to advise the commander, and by so doing protect him.
8. G-2, as any other staff officer, should have the courage of his convictions. A "yes man" contributes nothing toward success in battle.
9. It requires courage to say "I don't know"—and when will G-2 know the enemy intentions?
10. Faith in the reconnaissance and intelligence functioning of subordinate units depends upon a knowledge of their proficiency, which can be assured only by close supervision and attention to their training.

The Army and Navy Staff College

LIEUTENANT COLONEL FRANCIS R. SWEENEY, *Coast Artillery Corps*
Instructor, Command and General Staff School

THE COMMAND and General Staff School added still another course to its expanding curriculum when, on 7 June, the first class of Navy and Marine officers assembled for Phase I of the new Army and Navy Staff College. Newest of the courses at this military university, "ANSOL" bids fair to rank among its most important.

The vast importance of unified and coordinated operations in future campaigns, and the need for staff officers familiar with the procedure and problems of both Army and Navy, led to the decision of the Joint Chiefs of Staff to establish this new course of instruction. The questions of location, jurisdiction, curriculum, length of course and qualifications of faculty and students were studied by both the War and Navy Departments, and the Joint Chiefs of Staff approved the final plan in May.

The complete course of instruction covers four months; Phase I comprises two months in which students are at the Command and General Staff School, the Naval War College at Newport, or the Army Air Forces School of Applied Tactics (AAFSAT) at Orlando; Phase II, the latter two months of combined work in Washington, where the class assembles as a whole for the first time. During Phase I, Navy and Marine officers spend the first month at Fort Leavenworth and the second month at AAFSAT; Army ground officers, the first month at Newport and the second at Orlando, and Army air officers, the first month at AAFSAT and the second at the Naval War College. Classes from all three schools will assemble in the New War Department Building in Washington during the third and fourth months. Classes outside of Washington will start every second month, so that the combined sessions will be in continuous operation.

Supervision of the curricula and training in both phases of the course is exercised by the Joint Deputy Chiefs of Staff, through the Commandant of the Army and Navy Staff College, Lt. General John L. DeWitt. The courses of instruction are based on the purpose of the college as approved by the Joint Deputy Chiefs of Staff:

"To establish a special course of instruction for selected and qualified Army, Navy and Marine Corps officers in order to increase efficiency in the performance of command and staff duties in unified and coordinated operations of the Army and Navy forces."

The mission of the course at Fort Leavenworth follows naturally from this:

"To train Naval and Marine officers in Army organization, tactics and operations as a foundation

for their further training for staff and command duties with unified and coordinated Army-Navy forces."

The program to carry out this mission includes both classroom instruction and visits to other posts for demonstrations of matériel and technique. At the beginning of its course the class receives general instruction in fundamental organization and operations as a basis for further specific training. During this period the organization of the Army and of the principal arms and services is covered, and students become acquainted with military maps and symbols, and with fundamental operations.

The difference between Army and Navy staff organization requires that the class receive detailed instruction in army staff procedure. This covers the functioning and technique of the various general and special staff sections, both ground and air, in various types of operations. Army staff procedures, plans and orders are studied, as are the operations of large units. Typical employment of infantry and armored divisions in combined operations is considered, as are task force and amphibious organizations.

Army methods, both ground and air, of supply and service operations are presented. Service and supply functions, transportation and movement, and overseas supply operations receive a considerable part of the students' attention.

Instruction is also given in the organization and operations of the Army air forces, particularly in support of ground and amphibious operations, and airborne attack. However, since the class is to spend its second month at Orlando, the time devoted to air subjects is the minimum necessary for understanding of the air phase of other operations studied here, and as a foundation for further applied instruction at AAFSAT.

To supplement classroom instruction, the class spends a day with an armored division and another day at the Field Artillery School. The first class received a demonstration by the 14th Armored Division at Camp Chaffee, where the students examined the matériel and witnessed the technique and the tactical employment of various elements of the command. At Fort Sill, artillery-infantry coordination was shown on the ground, and the technique, speed and precision of artillery support was shown to the class.

The first ANSOL course totals thirty students, twelve from Army ground and service forces, six from the Army air forces, ten Naval officers (five of whom are naval aviation pilots) and two Marine officers. Future classes may somewhat increase in

size, although they are expected to remain small enough to permit instruction through developed discussion and the solution of many problems by the class acting as a staff or committee for their consideration.

Upon completion of the course, it is expected that its graduates will be assigned to staff duties involving combined or joint operations. Whether they be in Washington or in London, or on the staffs of task force commanders with land, sea and air components, they are destined to play an important part in our future planning. That their role will be an important one is demonstrated by the message sent to the

class on its first day by the Joint Deputy Chiefs of Staff:

"Upon the inauguration of Phase One of the course of instruction of the Army and Navy Staff College on June Fifth Nineteen Forty Three it is desired that student officers selected for this course be congratulated upon their selection. Please stress to them the high importance attached by the Joint Chiefs of Staff to the purpose for which the Joint Staff College has been established and the fact that each student will bear the responsibility of justifying the new institution by his individual performance."

Chemical Smoke Generator Company

DEFENSE of rear areas against hostile air operations requires ground as well as air measures. Active protection is supplied by interceptor plane pursuit and antiaircraft artillery fire. Passive protection includes dispersion, smoke blankets, camouflage, and barrage balloons.

The particular mission of a Chemical Smoke Generator Company is to camouflage a vital installation, or area, from aerial observation.

This is accomplished by covering the possible target with a blanket of smoke. The smoke makes it difficult for enemy planes to determine the exact location and boundaries of the objective. Precision bombing of the target is thus eliminated, forcing the enemy to resort to hit-or-miss bombing. The chief target may be struck by a chance shot, but the possibility of its being hit is exemplified in that old baseball saying: "You can't hit it if you can't see it!"

A smoke screen need not be dense to be protective. The number of particles in the path of light between the objective and the eye sufficient to obscure the target will be effective whether the path be short or long. Hence, the same number of particles, distributed over many feet of thickness, will give the same obscuring power as if distributed densely over a narrow segment.

Plans for smoke protection of a given area must necessarily be based upon a thorough study of the terrain and the weather characteristics of that particular place. Arrangements must contemplate a coverage from any wind direction.

To handle this situation we have the Chemical Smoke Generator Company. It is organized into two basic platoons—administrative and tactical.

The administrative platoon contains necessary personnel for company "housekeeping" and maintenance.

The tactical platoon is subdivided into a warning section and an operations section. The warning section is composed of a meteorological detail and a communications detail. The operations section comprises tactical process of realizing the final mission.

The means of securing the blanket of smoke is a series of mechanical smoke generators. These generators, placed at predetermined intervals at the right distances from the targets for a given wind direction, can effectively cover an area of great width and considerable depth. Being a mobile organization, the units can shift to other predetermined points as the wind shifts.

The advantage of obscuring or "blurring" particular targets can be augmented by setting up several similar smoke clouds in the vicinity and on dummy points. From the air, these give the illusion of fields or bodies of water. The multiplicity of clouds will be confusing to the attacking navigators and result in an abnormal dispersion of bombs.

The fundamentals of back-area smoke screening are simple. Whether it is called artificial "smoke" or artificial "fog" the basic operation is the same. Smudge pots for protecting orchards from frost are examples of peacetime smoke generators.

Obviously, such a protective device as the war smoke screen must be coordinated with the area defense program of military and civilian authorities. Blackouts are necessary with smoke screens so that light will not penetrate the cloud to guide attacking planes.

The practicability of back-area smoke screening is well summed up in the fact that whereas airplanes can look behind a smoke screen, they cannot look under it. For this reason, the Chemical Smoke Generator Company provides a new and modern type of camouflage for vital objects far behind the lines.

It must be borne in mind that a smoke screen does not have any destructive effect on the enemy but rather dilutes his energies to the point of ineffectiveness. In this way smoke always falls into the realm of Jules Verne and other imaginative writers of a past day who contemplated—perhaps with their tongues in their cheeks—a type of warfare of the future, many elements of which have since materialized.—(From CWS News Letter March 1943.)

Developing Leadership in Young Officers

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ALL ARMY officers, particularly the older ones, seem to feel that they are experts on the subject of leadership, and most of them have a desire to talk or to write about this all-important military quality. This should not be criticized for it is only thus that we are able to learn something about all the ramifications of the subject. But speaking and writing about leadership are not enough. The important thing is—What are we going to *do* about it? Or still more to the point—What are we *doing* about it?

First of all, let us divest our minds of that old fallacy that leaders are born. Given the proper material to start with, leadership can be developed by proper training. It is true, of course, that one must have certain basic characteristics upon which to build. These characteristics are developed over a long period of years in early youth. They may be partly summed up in the terms good character, physical fitness, education, and sound judgment. These alone do not make a leader, but with such qualities as a foundation the essential characteristics of leadership can be developed, or at least enhanced, by proper training. It is to this phase of leadership development that military men of all grades should give more thought and effort.

The job involves three principal steps. The first is the selection of suitable material during the basic training period. The young soldier who has above average intelligence and has developed in early youth the characteristics mentioned above is potential leadership material. If in addition he shows signs of having developed to some extent initiative, willingness to assume responsibility, aggressiveness along the right line, and plenty of energy, then he is well on the way for selection. Applicants for Officer Candidates School should be selected purely on this basis.

Now that the material has been selected, the Officer Candidates School takes over. This is the second step. The process of selection still goes on. As training in leadership progresses, certain defects in the material will develop which were not previously apparent. Much good material must be cast aside only because time is not available for its development. The present situation calls for speed in training. The pace is fast and many lose out because it would take too much time to develop their latent capabilities.

Upon graduation the candidate is commissioned a Second Lieutenant—and the third step begins. He is still far from being a capable, dependable leader.

His leadership qualities have to some extent been shaped and formed but have not been hardened or tempered by practical experience under proper guidance and supervision. The young lieutenant will never learn to be a leader until he is put in command of a unit and made responsible for that unit under the guidance, supervision, and instruction of a senior officer *who is himself a leader*.

Many observers and unit commanders criticize the quality of junior leadership, stating that the junior officers are expert instructors in technique but that in the field or in combat they decidedly lack initiative and aggressiveness. They make it clear, however, that these defects are positively not due to timidity or lack of courage. In one report, for example, it appeared that platoons directed to a certain objective by a certain route were too easily held up when something unforeseen occurred. The platoon commanders would usually have the platoons take cover while they reported back the situation and awaited orders. Units as large as a battalion were diverted from their main objective by side issues. One commander reported that, when firing was heard, all units seemed to drift toward the sound of the guns, allowing themselves to become involved in minor actions which did not contribute to the main effort.

One observer reported a case of a platoon commander who, after a long, hard march in rain and mud, was found at some distance from his platoon drying his clothes and arranging to make himself comfortable for the night. He had no idea of the exact location or disposition of his platoon, the condition of his men, or what action would be taken in case of attack. The observer and the company, battalion, and regimental commanders complained most bitterly of the quality of junior leadership and cited this case as a horrible example.

The cases cited are indeed examples of poor leadership, but merely to complain and criticize will not improve the situation. The blame must be placed where it belongs and immediate remedial action must be taken. Where does the blame belong? Right in the lap of those who are doing the complaining—the company and higher unit commanders! I have no patience with the senior officer who has had lieutenants under his command for many months and yet complains of their lack of leadership. I want to ask the question—What have *you* been doing about it all these months? If there is anything wrong with the leadership or any other phase of military train-

ing in a company, battalion, or regiment, then the blame for it must be put right on the doorstep of the unit commander.

Now for the vital question—What can be done about it?

Let us look first at the material we have to work with. We must assume that unit commanders have sent to OCS the very best potential leadership material that they have. This is the cream of the crop of young America. The selection process is carried on in OCS. If mistakes have been made in the original selection, they are weeded out in this phase of training. Only the very best are given commissions at the end of the course. The first requisite of a good leader is professional knowledge. The student has already shown aptitude in basic military training or he would not have been selected as a candidate, and this aptitude is further developed at OCS. There has been little or no complaint on this score. Now we have the best material with good basic training, technical skill, and a fair knowledge of the tactics of small units. Where, then, is the defect? The answer is: In lack of initiative, aggressiveness, energy, and responsibility. Where and how can this be corrected?

The principal part of his training must come after the officer joins his company. Here he is placed in command of a platoon. He must understand that it is *his* platoon. It will be just what he makes it. We are now beginning to develop responsibility—under the guidance and supervision, of course, of the company commander and higher commanders. The company commander must be concerned with the development and training of the platoon by correcting the development and training of the platoon commander. This is his most important function during the training period. In like manner and to an even greater degree it is also the most important role of higher commanders. After many months of this kind of training there should be no complaint of a lack of responsibility on the part of junior leaders. If there is such a defect of training, perhaps the leadership ability of company and higher commanders could well be questioned.

We are still greatly concerned about initiative and energetic aggressiveness. These are all-important qualities, vital in combat—the very foundation stones of combat leadership. Then we had better be doing something about it, and by doing something about it I don't mean merely complaining and criticizing. I mean *training*, and I mean that it must be done by officers who are themselves real leaders of men—who understand the meaning of leadership and how it can be developed.

Training in initiative and energetic aggressiveness can be carried on the same as training in any other military subject. As in any other subject, the instructor himself must be an expert (in this case, a leader) if he is to get the best results. If the unit is weak in the subject, the commander has failed in his training mission.

To develop these characteristics of leadership, one must first cut the apron strings that tie the lieutenant to the captain. Although it may be good peacetime practice to make a lieutenant a "file closer" for a long period of time, it certainly is not good practice now when qualities of leadership must be developed quickly and coincidentally with other training. Give the young officer a mission—an objective. Imbue him with the idea that his whole purpose in life for the time being is to accomplish that mission—to reach that objective. He must not permit anything to divert him. He must plough through to his objective in spite of hell and high water. He will make lots of mistakes at first. He may not accomplish his mission in the best manner or reach his objective by the best route, but he will learn valuable lessons and will take a long step toward developing his leadership qualities.

Here is where the guidance, supervision, and instruction of the senior officer comes into the picture. He points out and emphasizes the lessons to be learned. He gives another mission or objective more difficult to attain than the first. After months of this kind of training there should be less cause for complaint as to initiative, aggressiveness, or energetic leadership.

The next time a captain or higher officer complains about the quality of leadership of his juniors, ask him what he did about that during the training period. Ask him what he is doing about it now. Not all young officers have the makings of great military leaders, but proper training will raise the standard of all of them.

In spite of all that can be done, there will be some duds who get by. Some who show early promise will not develop. This is to be expected but the percentage will be quite small. If a man is inherently lazy, stupid, dishonest, poorly educated, or lacking in any of the other qualities that should have been developed in early youth, there is not sufficient time to do anything about that now. He must be gotten rid of. Here again, has the senior officer been equal to his responsibilities?

Practically every officer feels in his secret mind that he himself is a leader and that he knows all about leadership. He knows how to handle good leaders and what to do about poor leaders. Too often, however, he will relieve the poor ones from command and detail them to some unimportant job. This is wrong. If they have nothing on which to build, then get rid of them as officers.

Let us stop talking about leadership and leadership training in the abstract, and get out on the drill ground and the training areas and do something about it. It is a job for commanders of all units of all grades. The job can be done only by serious, concentrated, continuing effort; but it can be done. We need more Leadership Training.

The Air Support Command

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THIS ARTICLE deals with the establishment of an Air Support Command and its method of operation while supporting ground troops. These operations must fit the scheme of the army and, of course, will vary with the situation, and therefore the system of control for support aviation has to be wide enough and flexible enough to take care of any and all situations.

In this connection there are several points to be considered.

The first is that aviation in support of ground forces is formed into Air Support Commands which are ordinarily a part of an Air Force. It is that part which is organized, equipped, and especially trained to handle this class of support.

Field Manual 31-35 indicates that an Air Support Command supports an army. That statement must not be taken too literally for it may be neither necessary nor desirable to have an Air Support Command with each army. In some theaters ground forces may be engaged solely in guarding air bases, while the Air Force applies power in offensive strategic bombing. In other theaters the action may develop until everything may be joint air-ground operations, and in that case the entire Air Force may be thought of as an Air Support Command. Within any one theater it may well be that conditions will change with the development of the situation. For instance—in North Africa the emphasis had to be on air-ground support initially. Air Forces may revert back to more or less independent operations, against Italy for example, until the time comes for invasion when support of ground forces would again become the primary consideration.

For the second point, let me quote one paragraph from War Department Training Circular No. 37, dated June 29th, 1942: "There apparently is an impression that there will be a 'normal' amount of combat aviation available to support certain types of ground forces. This assumption is contrary to the basic principles upon which are based the doctrines for the employment of air power. The short duration of a single airplane attack requires large masses of aviation in order to make its fire power most effective against an objective. This is particularly true if fire is required over an extended period of time. This requirement necessitates maintaining combat aviation under central control to be employed in mass as each situation dictates. It precludes the more or less equal distribution of combat aviation to a number of subordinate ground units. No normal amount of

supporting aviation can be determined. In each case it will depend upon the estimate as to the amount required to accomplish the result and the amount available."

This quotation should dispel the impression that some of you may have obtained from what took place during some of the past maneuvers. Remember that in maneuvers the object is training and we do not always do exactly what we plan to do under actual combat conditions. That, of course, is desirable, but in the case of aviation there have not been sufficient amounts available nor have armies conducted maneuvers during the current year.

You should not start with a mental picture that air units must, from the very beginning, be tied securely to either ground or naval units. The idea that some air must at all times be attached to every division is not only false but it won't even stand the test of ordinary logic. A division is a force which can occupy at one time only a few miles of terrain. It fights on solid ground only, and its movement is extremely slow when compared to air units. This by no means makes a division an insignificant force—on the contrary, it is a powerful force admirably suited to certain operations. Aviation never has been, and never can be, considered as an accompanying weapon; so you should get away from the idea that air operations must begin by dropping bombs right in front of our infantry. Always bringing aviation within call of each battalion or division commander is not the basis of effective air support. The assignment of general missions is by far the best method of insuring maximum support.

The third point is that support of ground forces must take place in the following order:

- a. Gain and maintain air advantage.
- b. Secure information.
- c. Air attacks.
- d. Air transportation.

An entirely disproportionate amount of emphasis is often laid on the question of air support by means of attacks on enemy ground forces. It is believed that this form of support comes almost last in the priority of the ground forces' requirements. Enemy air reconnaissance and air attacks only begin to demoralize troops when the troops realize that these attacks can be conducted at will by an enemy who has complete control of the air. Examples of this occurred during the battle of France and again in Malaya. This fosters a feeling of helplessness many times out of proportion to the damage sustained.

Even during the Battle of France the British Army suffered more from the lack of fighter support than from the lack of bomber support. The only explanation that I can think of is that the British fighters could have been given the mission of supporting the army or of defending England, but not both. If this is the correct interpretation the decision was evidently made to defend England, and during the subsequent weeks the Battle of France was lost but the Battle of Britain was won.

During any engagement there will always be desperate need to see what is going on "over the hill." Much information is available only by means of aircraft, and reconnaissance will always be a heavy factor in proper employment of available means and therefore in eventual success. These two needs of fighter support and reconnaissance in a way complement each other. That is, air reconnaissance should be comparatively effective while we retain air advantage; it will be less effective as the degree of air advantage decreases and will probably be totally ineffective when the enemy controls the air.

The principles involved in air support are few and easy to learn. They can be stated as follows:

1. Local air advantage, first and foremost, is essential to effective air support. Sufficient enemy fighters can render light bombardment aviation ineffective and inflict heavy casualties.
2. Aviation should be employed primarily for tasks that cannot be performed by other weapons. Aircraft is more vulnerable and less easily replaced than other weapons. Targets must be sufficiently important to warrant acceptance of the risk involved.
3. Air attacks are not made within the effective range of artillery *except in emergencies*.
4. Full advantage should be taken of the flexibility, range, and speed of aircraft.
5. The limitations of aircraft must be understood and the characteristics both favorable and unfavorable of each type used must be appreciated. These vary with each type or model and cannot be fully learned from a book or conference. One must work and work with each type of airplane in order to know how to use it. A low-wing plane, for example, is not well constructed to observe targets which are not easily picked up. Why? Simply because the downward vision of the pilot is restricted. If the next question is, "Why not build a high-wing monoplane?" then the answer is that designers are, to date, unable to build one strong enough.

In addition, all principles of war apply to air forces just as well as they do to any other type of force, but these principles must be applied in the light of the capabilities and limitations of each type of force. Freedom of action, which springs from the fact that aviation moves in three dimensions, is the foundation of air power. This power of aviation is just now beginning to be understood, and is being expressed in many ways by military people.

In North Africa it was recognized that the very first goal of operations had to be the gaining of air superiority. The same factor enabled the German Air Force to drive away from Norway the world's strongest fleet. Crete is another example of friendly naval forces being either destroyed or driven out by aviation. The Battle of Midway furnishes us with still another example; but this time it was the enemy's naval forces that were either destroyed or driven out. The very same thing is true of the fighting in the desert or in the jungle of New Guinea, although specific operations have differed widely. In all of these operations ground and naval forces received a great deal of support, and the bulk of this support was not executed in the immediate vicinity of the supported forces. This is the result of applying power at the decisive point and in no way conflicts with the principle of massing all of the available means on the most important target. The principle of the objective applies to each unit for all means under the control of that unit commander. So, if an Air Support Command supports an army, we can expect the army commander to direct the application of his available air power on the most important target within the capabilities of his air. Because of the speed, flexibility, and mobility of aviation, the army commander can apply air power quickly on any part of the front. It would be both unreasonable and unsound to believe that pieces of this powerful striking force should be distributed among subordinate commanders.

At the time of the German campaign in France during May 1940 and periodically ever since, some rather mystic powers have been attributed to the German Air Force. Stories went around of the unfailing air support available to any subordinate commander in a matter of less than ten minutes. They seemed to be everywhere at all times. Others attributed the Germans' success to what was vaguely called "unity of command." So far as the Air Corps was concerned they went "straight through the book," and success was primarily due to air advantage and concerted action. Allied forces have since demonstrated their ability to plan and execute operations fully as well as their opponent, at least in Africa and in the Solomon Islands. No lack of cooperation or of "unity of command" has been detected, to my knowledge, in any operations, in spite of the fact that ground forces were commanded by ground commanders, naval forces by naval commanders, and air forces by air commanders. Unity of action is easily obtained if air superiority has been fought for and gained.

If all we have said is true, the next question might well be—how then is air support to be obtained? The answer is very simple and easy. It starts with the War Department allotting some aviation units to a theater commander who employs this aviation to gain air superiority and information first of all. While that

THE AIR SUPPORT COMMAND

is going on, air support available to a tactical commander will probably be very limited.

Next, some or all the aviation may be told to support some specific unit in the theater, such as an army—this now brings the air down to a tactical commander. The air commander and the tactical commander, with their necessary staff officers, determine a line of action for the entire force—from their decision a plan is evolved for the ground forces and likewise a plan is evolved for the air forces. It is obvious that, since the air in this case is doing the supporting, the air plan must be based on and made to fit the ground plan. The senior supported commander, who is charged with full responsibility for the outcome of the operation, must have full authority to discharge that responsibility—his decision that certain support will or will not be rendered is and must be final.

An air plan is no more difficult of formulating than is a ground plan—you, for instance, may have a plan "to attack at such and such a time with so much force, by enveloping one flank in order to attain a certain objective." The air plan to support such an operation would call for gaining air advantage, information, massing air attacks and perhaps transporting troops or supplies, in some area to support your main attack. It naturally follows that troops on other parts of the front might have to go with the minimum amount of air support or perhaps with none whatsoever. An aviation plan of support necessitates knowing something about the nature of the enemy forces, their general location, their possible action, and, perhaps more important, the intended operation of our own forces, which includes both the nature of the action and the probable time of its occurrence. A well conceived and coordinated plan will always bring the best results because air units can be thoroughly prepared. Intelligence is necessary—if it is not available, you must develop it before hoping to do much good.

The Air Support Command Squadrons are charged with furnishing the equipment and some of the personnel necessary to operate Air Support Controls and Air Support Parties. An Air Support Control is an air unit or detachment which is sent to the headquarters of the supported unit, and it has three functions:

1. Controlling the operations of supporting aviation.
2. Advising the supported commander as to the capabilities and employment of aviation.
3. Maintaining liaison with other air units. This may be other bombardment units, observation, the Bomber Command, the Fighter Command, or some other air force.

An Air Support Party is a highly mobile air unit which is sent by the Air Support Commander to the subordinate elements of a supported force—its main

function is to transmit direct to an Air Support Control the approved requests for air attacks of subordinate commanders.

By means of a typical situation we shall describe how the air operates, and the functions of these Air Support Controls and Air Support Parties.

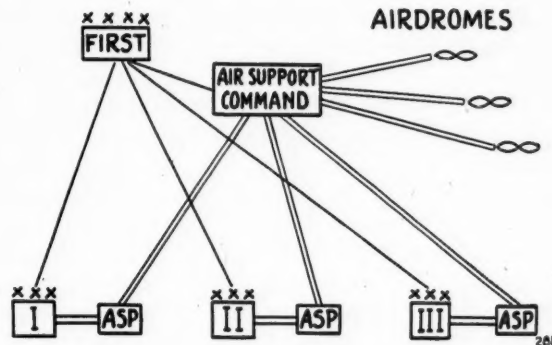


FIGURE 1.

Figure 1 shows a typical army of three corps. The normal channel between the army and the various corps is shown by the single black line. Now we will place an Air Support Command in support of this army. The first thing we do is to establish the command post of the Air Support Command immediately adjacent to the command post of the army. We would like to have it in the next room if possible. Each of these command posts is of fair size and no ordinary room would be large enough to handle either of them—but certainly the two command posts should be in the same general locality, that is, in the same town and as close to each other as possible. If distance must separate them, then several means of communications are established between the command posts. The Air Support Commander receives a directive from the Army Commander which points out, or directs, that a certain operation be supported. The Air Support Commander develops an aviation plan. In order to control the aviation an Air Support Control is placed at this Air Support Command Post, and from this control the aviation plan is executed; that is, the various messages are sent out as orders from this Air Support Command. That takes care of all planned missions.

For unforeseen missions we have to rely on someone making the request as soon as a target which may interfere with our operations is discovered. Therefore, Air Support Parties are sent to the subordinate elements of the army in accordance with a directive of the Army Commander. Whenever a subordinate commander wants aviation support he transmits his request to the first unit having an Air Support Party, and that Air Support Party transmits that request direct to the Air Support Control. Transmitting these messages is the primary and sole function which must be carried out by this Air Support Party.

Obviously this Air Support Party may also be used to advise the subordinate commanders as to the

practicability of locating targets, the probable time before attacks may be executed, and so on, but its first mission is that of transmitting the requests of subordinate commanders. Communication between the Air Support Parties and the Air Support Control is direct and by means of radio (Figure 1, double lines).

The Signal Battalion (Aviation) with the Air Support Command is charged with establishing and maintaining the communications between the Air Support Command and the various airdromes. In this case wire is the primary means of communications and radio is secondary, and of the wire communication teletype is the usual method used because we can then furnish a written message and it is as fast, if not faster, than other means. Wire communications from the Air Support Control to the Air Support Parties is very unlikely. It could be so arranged during a stable situation—but during stabilized operations it is doubtful that Air Support Parties would be used at all. In mobile warfare it would be impossible to keep wire communications, so radio must be relied on for communications between the Air Support Party and the Air Support Control. Note here that we have centralized control and that all of the aviation can be employed on one flank just as easily as it can be employed on the other flank.

This control becomes a very important set-up, since it directs aviation against all targets whether missions have been planned ahead or were requested after the start of operations. Each Air Support Commander prescribes the actual make-up of this Air Support Control. In some cases it will be fairly large and in other cases it may consist of only a couple of

AIR SUPPORT CONTROL

COMMUNICATION	{ Wire Radio
ACCEPTANCE	{ Representative of Ground Comd Representative of Air Command
OPERATIONS	{ Status of Squadrons Attack Orders—Loads— Routes, Etc.
INTELLIGENCE	{ Situation Map Information for Orders

FIGURE 2.

officers and a few enlisted men, but in any case it must carry out the following functions (see Figure 2):

1. The Communications Section operates the means of communication at the Air Support Control and at the Air Support Command Post. This includes the operation of a message center. Its function is, of course, to receive and transmit messages.

2. The Acceptance Section is really the heart of the entire control. It is made up of the representative of the ground commander and a representative of the air commander, each one having delegated authority from his own commander to make decisions in his name. That is necessary so as not to delay the

processing of requests that may come from subordinate units. Each one must have a thorough, complete, and accurate picture of the operation. Moreover, that picture must be kept up-to-date. The function of this section is simply to accept or reject the requests of subordinate elements for air support.

3. The Operations Section maintains a status board on which is shown the state of readiness of each squadron available for support. This section actually writes out the attack orders after selecting the proper unit to execute a mission. The target and its location must be described. The bomb load and the routes to and from the target must be specified, and such other things as the time limit of attack and possibly a bomb safety line may be stated. This section also recommends a secondary objective if one is not already stated in the request.

4. The Intelligence Section is charged with maintaining an up-to-date situation map which is used principally by the Acceptance Section, and it furnishes all available information on the target or on friendly or enemy troops which may either help or interfere with the mission. This section maintains very close liaison with the army G-2, and additional information is obtained from both observation and returning bombers, and a continual flow of information to and from the army is maintained. Immediately upon beginning an operation, the Intelligence Section gathers in all possible information on enemy establishments. Much of this information may not be used in the execution of air attacks but it should be available so that when something is selected for a target the information can be readily furnished.

The operation of this control is about as follows: Requests come in by radio to the Communications Section and are copied down in quadruplicate. One copy is filed in the message center—the other three copies are distributed at the same time, one to each of the other three sections. The Intelligence Section immediately looks up every bit of information concerning the target, or about friendly and enemy troops, both ground and air, capable of helping or interfering with the mission. The Operations Section actually writes out an order after selecting the squadron to execute the attack. In the meantime the Acceptance Section has examined the request to see that it complies with the Army Directive and to see what effect it may have on the army scheme of operations. A decision is then made to accept or reject this request. If it is accepted the attack order is O.K'd by the representative of the air commander and the order turned over to the Communications Section for transmission to the proper unit. If it is rejected the order simply is not sent. The subordinate element making the request is notified that its request has been either accepted or rejected.

The processing of requests through the Air Support Control should take less time than it takes to describe it. In a well-trained unit, from five to eight

THE AIR SUPPORT COMMAND

minutes should be sufficient and it does work providing the information is available and the members of the Acceptance Section have delegated authority.

All controls may not have the complete establishment found at the Air Support Command Post. However, the functions we have described have to be carried out in any Air Support Control. It is even possible that some of the needed information may be transmitted to a lower control by a higher one over available means of communication.

It may be that in certain operations, especially where there is sufficient time to plan everything thoroughly, some arrangement other than one central control might work to better advantage. That may occur due to distance involved or to lack of proper communications. If indications are that better co-operation between ground and air could be had by placing Air Support Control with a lower unit than the army, our organization should be able to handle it, and here is an example of that very case (Figure 3):

An Air Support Control is now located with a corps, and Air Support Parties are sent to the divisions of the corps. The very same functions are carried out as we described in the previous example. Note the broken line which denotes a different radio channel from the double line. The radio set furnished to Air Support Parties consists of one transmitter and three receivers, which enable any party to listen in on three nets. In this example the Air Support Control has been authorized to call direct on one air unit which has been reserved for the support of this

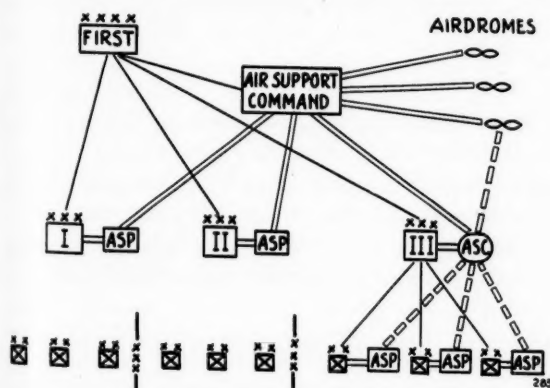


FIGURE 3.

corps. It is to be noted also that the Air Support Commander never gives up control of his aviation and that any allocated units can be quickly brought back under army control if that becomes necessary.

We can go down lower than a corps if the situation demands it.

Figure 4 shows an Air Support Control with a

division, and Air Support Parties with each of two combat teams. This set-up cannot be called usual but will be rather exceptional—but it can be arranged if necessary. Air Support Controls or Air Support Parties can be sent to even lower echelons. Note the radio net with aircraft in flight (dotted lines). Normally the Air Support Control is the only one which

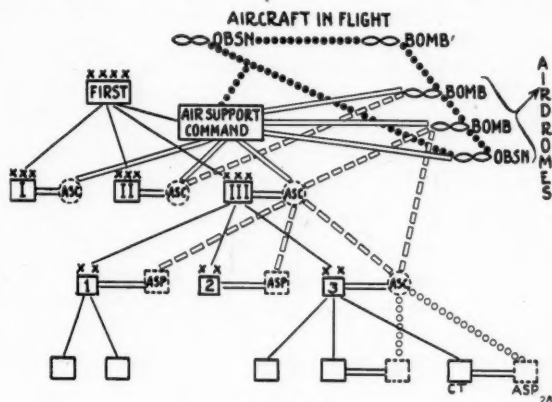


FIGURE 4.

communicates with aircraft in flight, but in emergencies, if any help can be secured from Air Support Parties, they can be directed to contact units in the air. Transmitters can be quickly changed to the frequency of the units in the air.

SUMMARY.

This system can be adapted to any situation. It is evident, of course, that an Air Support Party or any other person on the ground will not be able to discover many aviation targets in time for aviation to oppose them properly. However, in open warfare, certain ground reconnaissance agencies may be able to move around the flanks, or perhaps even in the rear of the enemy forces, and bring back the needed information. In addition, the Air Support Party can be used to communicate with aircraft in flight if that becomes necessary. Furthermore, a direct and usually reliable channel for information is thus available to both the subordinate ground commander and the Air Support Control where either one of two targets, but not both, can be engaged by aviation. The thing to look for in this case is, of course, the wishes of the ground commander, since it might not make much difference to the air which target is engaged, but it might make a great deal of difference to the ground commander.

In closing, let me remind you that all ground units will not always have aviation support, nor will control be found at all corps, nor Air Support Parties for each division. The supporting aviation will generally be held under one control and will be employed in mass as each situation dictates.

Activation of a Service Command School for Training State Guard Personnel

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STATE GUARDS, organized under the authority of Congressional legislation of October 1940, are an important part of our national means for internal security. They have a great potential value in controlling civil disturbances and disasters resulting from the war or other causes.

Their organization has been completed in forty-four states, and in the event of some sudden internal emergency Guard units may be the first immediate means available to the Commanding General of a Service Command on which he can depend to control some local, but possibly serious, situation.

In view of their potential value to the Service Commander, he is vitally interested in the training of Guard units, and their progress toward attaining their training objective which has been defined as that of "being able to take the field on short notice, and capable of executing internal security missions."

The Service Commander has the full responsibility for internal security of his command, and the rapid attainment by Guard units of their training objective is one of the many important problems confronting the Service Commander.

Guard personnel can devote only a limited amount of time to training because of their civil occupations. So the problem of the Service Commander necessarily becomes one of increasing the "training value" of the short weekly and summer training periods of the Guard.

This may be solved in part through the activation of Service Command Schools for Guard personnel, to insure better qualified officer and noncommissioned officer instructors, and to improve methods of instruction.

Assuming that the Commanding General of a Service Command directs the activation of such a school, what are the immediate problems confronting an officer who has been assigned that responsibility?

First.—He will have to determine the objective for the school, as to what is to be accomplished in the way of instruction. That is an important decision, because the training objective forms the frame around which he will build the instruction program.

Primarily that training objective should be to provide instruction in methods of instruction, so that Guard personnel attending the school can learn, through observing the methods used, how to teach and put on problem demonstrations.

The instruction program should include only sub-

jects that are applicable to the employment of Guard units in internal emergencies.

Second.—What subjects should be included in the school schedule?

While of course this will depend to a great extent on the period of time for the school, the instruction should be primarily basic and should not go beyond:

Rifle company tactics—attack and defense.

Various other basic subjects such as

Military discipline and courtesy

Weapons—marksmanship

Map reading—use of compass

Riot duty formations

Demolitions and obstacles

Scouting and patrolling.

The decision to confine the instruction to basic training will assist materially in arriving at the period or length of the course.

Instruction in these basic subjects can be covered in a comparatively short but intensive training period which should not extend beyond ten days or two weeks because Guard personnel will find it difficult to get away from their jobs for any greater length of time.

Who is to attend the school? It should be made available to all commissioned guard officers of all ranks in the Service Command.

These should be instructed in successive groups, probably not exceeding 150 officers at a time.

In the average Service Command it would take possibly two months to instruct those that desired to attend.

One other thought in connection with student personnel—

If a further acceleration or speed-up in guard training is considered necessary, plan to include the upper noncommissioned officer grades after the officer schools have concluded.

Now, having reached decisions on these matters, the planning for the school has reached a point where concurrence should be secured from the several Adjutants General of the various States of the Service Command on the items we have just outlined.

It is probable that they will make several suggestions as to changes in the program—items or subjects which some of the Adjutants General may want included.

ACTIVATION OF A SERVICE COMMAND SCHOOL FOR TRAINING STATE GUARD PERSONNEL

In connection with that thought—don't forget that word "cooperation" which represents the scope of the relationship between the Service Commander and State authorities.

SELECTION OF TRAINING AREA.

Next, the decision as to where to hold the school; and that of course will involve the consideration of what is available within the Service Command.

The minimum requirements as to buildings will be:

- One or two (preferably) large buildings (barracks) for inside instruction
- Quarters for students—barracks or tents
- Quarters for school personnel
- Mess buildings (2) for officers and E.M.
- Headquarters (school) building.

These probably can be made available in one of the camps located in the Service Command, and that is a desirable place to hold such a school. In addition to building availability, the use of many training aids—target ranges, obstacle demonstrations, etc.—that will be required during the period of the school may be arranged. The availability of these aids outweighs the other advantage of holding the school in some quieter or less distracting small Headquarters Post.

TROOPS FOR SCHOOL PURPOSES.

What are the considerations involved in getting troops for school purposes, demonstrations, etc.?

If the school is to be held at one of the camps in the Service Command, it can probably be arranged to borrow squads, platoons, etc., for certain demonstrations that are planned, provided the schedule is completed early enough and the request submitted to the unit commander in time so that it can be worked into his training schedule.

But even at best, in the use of borrowed troops, the commanding officer of the school will be continually confronted with problems, such as requests from the C.O. of the troops to change the time of the demonstration as it has just been discovered that it would interfere with their own program, etc.—or the school authorities will not be able to get the troops in time for them to rehearse the demonstration they are to put on.

The best solution to this problem of school troops is to have a Military Police Company assigned for the period of the school. You will have them for rehearsals and demonstrations when you want them.

SCHOOL STAFF ORGANIZATION.

Now let's consider the school staff and faculty organization required:

First.—the school staff personnel.

Executive.—A school executive officer should be included, and given the assignment of active supervision of all instruction.

Mess and Supply Officer.—A mess and supply officer will be required to supervise the messes and to procure and draw the various necessary items of equipment, such as cots, blankets, sheets, etc., for the students.

Administrative Officer.—An administrative officer should be included in the school staff personnel to assign and supervise the work of enlisted men at Headquarters, in getting out schedules, mimeograph material, etc.

Liaison Officer.—A liaison officer should be added to the school staff for contact with various camp authorities on procurement and use of ranges, training areas, trucks, etc., and to have charge of arranging all motor transport. In emergencies he would become the double-checker on many details that come up and that have to be followed up.

The procurement of required enlisted personnel such as typists, messengers, mail clerks, etc., can be secured by detail from the school troop organization.

Next.—the problem of instructors.

An examination of the school instruction program will pretty well dictate the number of instructors required. A school of the suggested size (150 students) will require probably around ten to twelve instructors.

Infantry instructors should be requested to cover subjects such as infantry tactics and demonstrations.

Engineer instructors for subjects such as demolitions, obstacles, etc.

Chemical Warfare instructors for instruction in use of non-toxic gas and smoke, etc.

These instructors should be recent graduates of the various service schools—such as the Infantry School at Fort Benning—as they will have retained a fresh idea of how various demonstrations should be put on—and proper instruction methods. These instructors will be procured, of course, from the various posts and stations in the Service Command. In the request for instructors, have the Post Commanding Officer make a tentative selection, and from this tentative list the instructors should be selected by actual interview. Remember that, in addition to educational qualifications, a pleasant personality and some pep is a prerequisite for the instructors if the school is to be a success.

ALLOCATION OF FUNDS.

Another problem will be that of completing a request for an allocation of funds for incidental expenses for the school. These incidental expenses will probably be greater than expected. They will include:

- Stationery supplies
- Mimeograph paper and ink
- Maps—printing
- Gasoline and oil
- Long-distance phone charges
- Blackboards, chalk
- Training aid construction, etc.

The estimate should be completed and submitted promptly for approval.

In conclusion, two final points:

1. The tentative plans for the school should be completed early enough so that there will be sufficient time for the proper consideration of the many problems that will arise.

2. Move all school personnel, staff, instructors, and

school troops to the school area at least two weeks prior to the opening of the school in order that final preparation for the reception of the students, the construction of training aids, the rehearsal of troop demonstrations, etc., may be expeditiously handled.

Don't attempt to rush into such a school program. Its potential training value is too great to nullify it through improper planning or preparation.

Combat with Small Enemy Groups

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a Russian article written by A. Kuznetsov, in *Krasnaya Zvezda* 13 December 1942.]

The attack activities of our units on the central front again bear witness to the fact that winter combat frequently comes down to a battle for possession of the highways, which are of very great importance in winter. Whoever controls the roads suitable for motor-transport has secured the possibility of maneuvering and the uninterrupted supply of troops. The Germans took account of this in preparing for the winter.

On the central front, in villages situated on the roads and in the outskirts of forests permitting control of the roads, the Germans created strong control points by building dugouts and by laying out mine fields and dense networks of wire and other engineer-erected obstacles. In other words, the enemy, shifting to defense, tried to set up a series of intermediate defense lines intended to wear down the strength of the attackers, to bleed them even before approach to the main zone of defense. As the experience of the winter attack operations showed, the Germans stubbornly defend these intermediate positions. The battles here are of violent nature and usually end with the general extermination of the foe.

Something new in the defense tactics of the Germans is to be observed. They not only try stubbornly to defend the positions prepared in advance, but in addition they have recourse to mobile defense, making extensive use of small groups. Formerly, when undertaking an attack, the Germans threw out mobile units on the flanks or to the rear of our forces for the purpose of destroying communications and disorganizing the command of the troops. Now, in defensive combat, these groups fulfill other tasks. They cover the withdrawal of their main strength and impose unprofitable frontal battle on the attackers.

The mobile groups of the enemy are small units of 30 to 60 men, armed with automatic rifles, light machine guns, and sometimes heavy ones. Their basic tactic is sudden attack. Operating in accord-

ance with the situation and the nature of the locality, they set up ambushes in inhabited places and in woods, and endeavor to inflict loss on the personnel of the attackers by surprise bursts of fire. In populated places the German automatic riflemen usually take up position in the attics of outlying houses, in isolated sheds, in bathhouses and cellars. It sometimes happens that the attacking units, neglecting reconnaissance, move at once into the village with the whole body in its tight combat formations, and naturally they suffer losses.

Elements of a certain infantry unit attacked two inhabited places simultaneously. According to reconnaissance data, these places had been given up by the enemy upon hurried withdrawal to the southwest. And in fact, on approaching the villages the attackers did not meet any sort of resistance. But as soon as the soldiers got near the sheds on the outskirts, fire was opened on them unexpectedly from several directions. The officers of the units saw that it was a matter of hostile ambushade. Detachments of soldiers were immediately sent out to destroy the small groups of the enemy hiding in the sheds. The sudden fusillade would naturally have been prevented if the attackers had conducted active reconnaissance along the whole route of movement.

What is the most effective way of fighting small groups of German automatic riflemen? Experience shows that under winter conditions the attacking units must detail small detachments of ski troops to blockade, surround, and annihilate the small hostile groups. We recall that the hostile automatic riflemen fear encirclement. As soon as our troops show themselves on the enemy's flanks, the enemy will begin to feel insecure and will try to withdraw as quickly as possible. The ski units must act rapidly and decisively, because a delay on their part may be reflected in the tempo of the attack and in the solution of the basic tactical problem.

Upon withdrawal the Germans often lay an ambush in the forest. The automatic riflemen select a hiding-place on the edge of the woods or on the slope of a ravine covered with underbrush, near the road. Furnished with blasting equipment, they plant mines both on the road itself and at the places where it will probably be flanked, covering the mines with a thin layer of snow. Our reconnaissance has more than once encountered such operations of small hostile groups.

Completing a turning maneuver, a certain unit was to come out by a woods road to the western edge of the forest and concentrate there. The combat outpost which had been sent on ahead under the command of Senior Lieutenant Udachin noticed fresh tracks in the forest. This put the soldiers on their guard. Continuing their advance, they discovered many German mines on the road. Soon automatic rifles sounded. The Germans had opened concentrated fire on the reconnaissance from ambush. Sizing up the situation, Udachin divided his detachment into two groups, which surrounded the hostile ambush. Twenty enemy automatic riflemen were killed and ten surrendered.

What general conclusion is to be drawn from all the experience of combating small enemy groups? Only careful, expert, and continuous reconnaissance can prevent unexpected encounters with hostile ambush on the part of the attacking units. Reconnaissance must feel out the troops' course of movement with fire, must carefully examine the suspicious places, must comb the woods and ravines. If fire resistance by small groups is encountered, the attackers must refrain from frontal movement and immediately send forward mobile detachments. The strict fulfillment of all these conditions will completely forestall surprise attack, will protect the strength of the troops, and will permit them to carry out their basic combat task more quickly and with fewer losses.

Unloading Ships in Foreign Ports

COLONEL J. G. COWLEY, *Royal Engineers*
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IF THERE is one single factor in this war which is more important than any other—that factor is shipping. We will shortly have all the trained men, all the equipment, tanks, and airplanes that are needed to defeat the Axis, but these are of no use unless they can be taken to the places where they are needed. The only method of carrying vast quantities of men and stores is by ship—air transport has not been developed as yet to the stage where it can compete with the vast tonnage needed to fight modern wars. Shipping is the key to victory, a fact which is too well known to the enemy, who are making every effort to sink ships because they realize that in doing this lies their only hope of prolonging the war until we reach a state of exhaustion.

Many of the readers of this article may shortly be in a position to save shipping. They may be working at or near some foreign port where ships loaded in America or Great Britain are discharging their stores and men. If this port is working efficiently and wasting no time in turning around the ships which come in, then they and all the staff connected with the running of the port are helping to solve the shipping problem. If, on the other hand, by inefficient working or by bad layout of the port installations ships are being delayed, then they are committing the unforgiveable sin—wasting ships.

This article is intended to give a general picture of how an unloading port should be run. It mentions no details, as these vary with the individual ports. The principles laid down are common to all unloading ports; they are the result of experience in working the port of Alexandria and some of the small ports along the North African coast. These will be similar in many ways to the ports which may shortly be in Allied hands on the coast of Europe or in the Pacific.

Do not get the impression that these ports will be handed over by the enemy with all their installations intact. It is almost certain that the cranes and dock installations will have been destroyed, that the railway system will have been damaged and the rolling stock removed. There will be a period of several months before this damage can be repaired or replaced. During this period the port must be worked with whatever equipment can be improvised.

Properly organized and efficient dock labor will not exist. Local labor of a sort may be available, but will probably have to be supplemented by imported enlisted labor. It is a false and dangerous impres-

sion that these unloading ports will resemble in any way the efficiently run and well equipped ports of the United States. Anybody who expects that will be sadly disappointed.

The main principle on which an unloading port must be worked is that docks must be kept clear. When a ship comes in it unloads its cargo either directly on the docks or into lighters which in turn unload on the docks. If this cargo is allowed to accumulate, a stage is reached, and reached very quickly, where the pile of stores on the dock is so great that the ship cannot continue to unload. The ship and other ships which are scheduled to follow it are held up.

It follows, then, that the rate of clearance from the docks must equal the rate of unloading of ships. This entails three things:

1. Adequate transportation to clear the stores from the docks to the depots.
2. Adequate labor to handle the stores on the docks.
3. Adequate labor to handle the stores in the depots.

To put this in a simple mathematical form—if X ships can unload at once at an average rate of Y tons per day each, the clearance transportation must be capable of lifting $X Y$ tons per day, and the labor at the docks and at the depots must both be capable of handling $X Y$ tons per day.

There are three main methods of clearing stores from the docks:

1. By road.
2. By rail.
3. By inland waterway.

A road will always be available, and the use of road transportation in a captured port is likely to be the main method of clearance. Railways may not exist in small ports, and are likely to have been destroyed at larger ports. An adequate number of road trucks is essential. Clearance by road from docks to depots is efficient and flexible. The truck load is a small unit, and there is no difficulty in loading trucks with commodities for a single depot. Railway trains on the other hand may contain too many stores for any one depot, and the necessity for shunting will entail delay. A truck can make several trips a day by road between the docks and the depots, provided the latter are situated close to the dock area. A railway truck is not efficient over a short

distance, as the journey time is short compared to the time wasted in shunting and marshalling trains.

A number of ports on the coast of Europe are situated at the mouths of rivers or the entrances to canal systems. Barges may be available and should be used to relieve the strain on road and railway transportation. This method of clearance is slow, and cannot be used for urgently required stores, but a number of heavy and bulky stores are not in this category, and for these, waterway transportation is of great value. It may be possible to use the lighters and barges which navigate the river or canal to receive stores from alongside the unloading ships. If this can be arranged it saves time, but the minimum number of lighters must be retained in the port so as not to delay the movement of cargo from ship to dock.

Labor, as mentioned above, may be either local or imported. The latter will probably be enlisted labor. At Oriental ports it is difficult to work white troops alongside native laborers. The latter normally consist of poorer types of natives, and the effect of seeing white troops doing rough manual labor side by side with native workmen has a bad effect both on the prestige of the troops in the eyes of the local population and on the morale of the soldiers. If local labor is not sufficient, it is better to divide the labor on the docks so that the enlisted men work certain ships and the local labor work others in another area.

The supervision of local labor is best undertaken by local overseers or contractors. American and British troops, unless they are expert linguists, will find that the language difficulty in supervising gangs of natives creates much confusion. These remarks apply less to European than to Oriental ports, but the same difficulties in some degree will be found anywhere outside the United States and Great Britain.

In order to insure the quick turn-around by road between the docks and depots, the depots should be sited within about twelve miles of the docks. This figure should give, at a well run port, an average of four or five trips per truck per day. Routes to and from these depots must be carefully worked out so that there is no delay caused by traffic jams. Most overseas ports are renowned for the narrowness of their streets, especially in the dock area. The proper policing of these streets and the clearance of civilian traffic from the road is essential.

The siting of depots depends on a number of factors other than convenience for the clearance of the docks. Antiaircraft defense and the location of existing warehouses and railway lines must all be taken into consideration. The figure of twelve miles mentioned above may not be possible to put into practice, but is given as a guide.

In order to avoid delay entailed by sorting mis-

cellaneous goods at the docks, it will be necessary to have a general depot to which all classes of stores which cannot easily be identified can be taken for careful sorting before removal to their proper depots. Any goods that can quickly be sorted, however, should be taken direct from the docks to the appropriate commodity depot as this saves extra handling.

A casual camp for all personnel who disembark should be sited within marching distance, about ten miles, from the dock area. Disembarked men must not be kept hanging around as they add to the congestion and impede the work of the dock laborers. Directly they disembark they should be "fallen in" and marched away.

Near the casual camp will be sited a vehicle park to which vehicles being unloaded from ships should be dispatched. Vehicles normally travel in the ship with their fuel tanks empty. It is necessary to have some mobile gassing arrangements on the docks to fill these vehicles with sufficient gasoline and oil to enable them to move from the docks to the vehicle park under their own power. Vehicles which arrive slightly damaged and unable to move away under their own power will be towed by other vehicles from the docks to the vehicle park. In no case will vehicles be left for repair on the docks, where they will add to the congestion.

Numbers of vehicles will arrive cased. An assembly line for cased vehicles must be set up near the docks. After being assembled these vehicles will be gassed and sent off to the vehicle park. It may be possible to use vehicles which are unloaded from ships to help clear the stores from the docks to the depots. This will greatly help the transportation which is normally used for this work.

A good communication system is essential for the efficient working of any port. The docks must be connected by telephone to the depots, to the casual camp, and to the vehicle park. Unexpected cargoes frequently arrive and the appropriate depot must be warned quickly; parties of men turn up without warning and the casual camp must be warned straight away to make arrangements for their reception. It is no good relying on orderlies delivering these messages as this results in delay, and the local telephone system may be neither efficient nor secure. Direct telephone lines are the best and quickest means of communication and should be installed as soon as possible.

All clearance transportation, road, rail, and barge, as well as labor at the docks, must be under control of one man. These factors are so closely connected that the port cannot be worked efficiently if they are controlled independently. This controlling officer, the port commander, must have the earliest possible warning of incoming ships. He has to know both the times of arrival of ships, and the cargoes in them, well in advance. This information must be

UNLOADING SHIPS IN FOREIGN PORTS

sent to him from the loading port by cable, air mail, or any other rapid means. It will be seen that an unloading port for ships over a short sea voyage is more difficult to work than one at the end of a long sea voyage. It is therefore more important when the sea passage is short to make sure that the manifests, cargo summaries, and sailing cables are dispatched promptly from the loading ports.

Prior planning is necessary for berthing and unloading ships, and arrangements must be made in advance for transportation and labor, both at the docks and in the depots, for rapid clearance of the cargo. This prior planning is only possible when information from loading ports is received in time. If this information is not being received promptly, the unloading port commander must take action with the proper authority to improve its rapid dispatch from the loading port.

Under the command of the port commander will be the officers in charge of port road transport, port rail transport, port inland waterway transport, and port labor. The labor at the depots is normally under command of the depot commanders who must work in very close touch with the port commander. It is advisable to have a daily meeting, at which the port commander presides, and the officers in charge of the labor and the various types of transportation are present. Representatives from each depot and representatives from the staff of the casual camp and the vehicle park should also attend when required. At this meeting details of incoming cargoes will be read out, and arrangements made for clearance to the appropriate depots.

It is not always possible or advisable to work ships at night. If ships continue to unload throughout the twenty-four hours it means that transport and the labor both at the docks and at the depots must also continue. There will seldom be sufficient transport and sufficient labor for this work. Night working is not nearly so efficient as day working. Shaded lights are essential in the holds of the ships and on the docks, as it is not possible to handle heavy loads in pitch darkness without endangering men's lives. Road movement at night is slow, and trucks must have time off for maintenance. A truck which is worked continuously by relays of drivers will soon break down if its daily maintenance is neglected.

Although as a general rule night work is not advised, it may be unavoidable at ports which are heavily bombed throughout the hours of daylight. During the siege of Tobruk, for instance, most of the unloading was done at night as ships could not risk being caught in the harbor by day.

Certain ships contain cargoes, such as ammunition and gasoline, which are so dangerous that it is essential to unload them and clear the cargoes out of the port area as quickly as possible. In these cases, continuous unloading, twenty-four hours a day,

must be worked. If possible such ships should be kept away from other ships in the harbor. During the spring of 1941 a lucky hit by a bomb on an ammunition ship in a crowded harbor in Greece exploded the ship, which destroyed all the port installations within the radius of a mile and sank every other ship working in the port.

In harbors where isolation of dangerous ships is not possible, and where night work cannot be undertaken through lack of labor or lack of transportation, it may be necessary to send the ship out of harbor during the night so as to avoid danger to other shipping. This was frequently done in Alexandria during the period of heavy enemy air activity over the port area.

In some small ports it may not be possible to bring ships alongside the docks, in which case all cargoes will have to be unloaded into lighters. This is not such a disadvantage as it may seem, provided that a sufficient number of lighters is available to work both sides of the ships. In such ports separate commodities can be unloaded onto separate docks, which makes the problem of clearance very much more simple.

Ships do not unload at a steady pace. The rate of unloading depends largely on the type of cargo. With a very varied cargo including occasional heavy lifts, it may be necessary frequently to alter the rigging of the ship's derricks. This is a slow process. Normally, when a ship is being unloaded for several days, the first and the last days produce smaller unloading tonnage than the middle days. The smaller holds are emptied before the larger ones, which means that, toward the end of the unloading period, cargo may be coming out of one or two hatches only. An average rate of a thousand tons per ship per day is a good all-around figure for unloading general cargo using the ship's derricks only with four or more hatches working.

A port is a priority target for the enemy air force. Workers in the harbor area will be under fire. Air raid shelters near the docks are essential. The nearer they are to the place of work the less time is wasted by the labor in taking shelter. Indifferent labor will spend many minutes after the raid is over before they emerge from the shelters, and it will be necessary to keep a close watch to see that time is not wasted in this way before they return to work.

The labor actually working in the ships may not be able to reach the dock shelters in time, especially when the ships are anchored out and being unloaded by lighter. In this case the only answer is to put the best labor in the ships and to tell them to stay where they are during air raids.

In Tobruk the writer had plenty of opportunity to watch various types of men, African, Oriental, and Western, reacting to heavy and continuous air raids.

One rule was found to be useful, especially with colored labor. Nobody must be allowed to run. Running is infectious, and the sight of a large number of men rushing along the docks, accompanied by the wild shouting that is habitual to the Oriental, is a frightening sight even for the most cold-blooded person. Walking to the shelter produces a feeling of calm, and

also avoids the delay caused by crowding the entrances. This rule is difficult to enforce, but well worth consideration.

All officers who work at unloading ports must remember that anything they can do to speed up the turn-around of ships is a direct contribution toward winning the war.

Camouflage Do's and Don't's

DO CHANGE your position carefully. A proper "estimate of the situation" will make your work easier and avoid impossible camouflage problems.

Do avoid the skyline when concealing against observation from the ground.

Do make full use of natural cover. Utilize ditches, hedges, edges of woods, folds in the ground, etc.

Do avoid conspicuous landmarks. You don't want to be at a focal point of enemy attention.

Do keep in the shadow. The enemy can't see or take pictures in the shade.

Do remember that shadows move. Although shadows as a rule fall toward the north, their length and direction change throughout the day.

Do avoid regularities of line of spacing. Nature has no straight lines and the enemy is looking for unnatural signs.

Do garnish carefully. Natural garnishing must look NATURAL, so use material similar to that in the vicinity and support it as it would grow.

Do thin out garnishing at the edges. A regularly garnished net casts a regular shadow which is obviously out of place in the surroundings.

Do change dead vegetation. Forget and something (or somebody) will be dead.

Do keep turf or topsoil when digging in; use it to cover your spoil on the parapet.

Do make bold pattern, in garnishing or painting. You can't see a two foot "break" in the outline from a distance of a mile.

Do "look before you leap." Plan and lay out your position in detail before moving in and trampling down promiscuously.

Do observe camouflage discipline in making a reconnaissance. Signs of activity before occupation are just as disastrous as signs afterward.

Do restrict movement when the enemy is observing. A moving object may attract attention.

Do take extra care when tired. Fatigue leads to carelessness.

Do work in the shade or at night. The enemy is looking for you at all times but his eyes are not as good as a cat's. He can't hit what he can't see.

Do keep your flat tops "flat." Sagging nets are worse than baggy knees.

Do use existing roads. Traffic here will not leave noticeable signs.

DON'T BE careless and give away your buddies. They're depending on you just as you are on them.

Don't look up at airplanes. The enemy is looking for you too and you're easier to hit than he is.

Don't move unless you have to; then think first how you can move to cover most unobtrusively.

Don't use artificial materials unless the natural cover is insufficient. Natural cover blends best with Nature.

Don't be regular in your layout. Regularity is a military attribute and the enemy recognizes it as such.

Don't take shortcuts over the open or step outside cover. Every time you put your foot down you attract forty-eight square inches of enemy attention.

Don't walk around the outside of a net to fix the camouflage. Where you walk will be light in a photograph; the camouflage will be dark.

Don't hide your installation and leave your spoil and belongings in the open. Remember the ostrich!

Don't let your flat tops sag. They will photograph like a wet blanket laid out on brushes and they are not a bit safer.

Don't lower the sides of your camouflage. Your commanding officer cannot see what you are doing, but when the enemy sees the shadow thrown by those sides he will be even more severe.

Don't hide under matted camouflage. It is as conspicuous as a bad haircut.

Don't end a road at an installation or make a lot of trails to a position. Have you ever lost your way to a canteen?

Don't leave things near the edge of your camouflage. The edge of your camouflage isn't—and shouldn't be—opaque.

Don't put up bad camouflage and think it's a magic veil. There aren't any in war.

Don't crowd around an installation. Dispersion reduces the likelihood of conspicuous trampling.

Don't clean up old position; it won't look natural to the enemy. If you're moving out, it will remain as a dummy; if you're moving in you don't want to change the appearance.

Don't expose lights or make a great deal of smoke. The enemy is looking for such beacons.

(Air Force, March 1943.)

Supplementing Artillery Fire With Tanks

The following method of supplementing the artillery fire with tanks is employed in one of the armored divisions. The employment of tanks to assist (at times) the artillery as brought out in these instructions is believed sound.—THE EDITOR.

GENERAL.—Each battery will assume temporary control of one or more platoons of tanks; thus three artillery battalions will direct the fire of one or more battalions of tanks, depending on the number of platoons assigned to each battery. The assignment and conduct will be controlled by the battalion of artillery.

The position the tanks will occupy will be surveyed-in by the battery survey party and will be plotted on the fire direction fire chart. The fire direction will determine the direction on which to lay the center tank by knowledge gained by previous artillery survey or fire. A position and initial direction for each tank will then be staked out in daylight by the battery survey party and marked for night occupation.

The tanks will be led into position under cover of darkness, lay on the aiming stakes and set a deflection of zero.

A schedule of fires will be given to the platoon commanders.

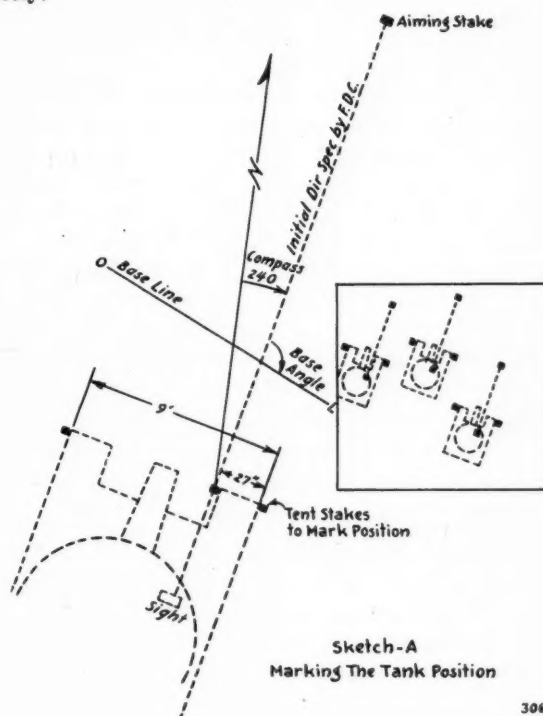
Movement of Tanks Into and Out of Position.—During daylight each battery will send an agent to report to the battalion liaison officer (all three agents under one officer) who is with the commander of the armored regiment. The commander of the armored regiment will assign the liaison officer of the company from which he is to receive the tanks. The liaison officer will confer with the company commander as to the time of movement, reconnaissance of route, and as to the time and place of assembly after indirect fire position and of the route to the assembly area. The platoon commander guided by the battery agent will move to his indirect fire position at the specified time. Upon release from the artillery, the platoon commander will proceed with his platoon to the prescribed assembly area. A division artillery staff officer will coordinate the plans of the liaison officers from the three artillery battalions. He will specify the general route to these battalions and with the armored regiment commander will coordinate the route to and the location of the tank assembly areas.

Ammunition Supply.—The artillery commander will inform the G-4 as to the amount and type of ammunition needed to complete the mission. G-4 will deliver the required ammunition to the service battery of each battalion. The allotted ammunition

will be dumped beside the tanks after they have been spotted. The trucks will then return to their unit.

All tanks will move to their position, fully supplied with ammunition. They will not use ammunition from their racks, but will use the ammunition supplied for this particular mission. This will enable the tanks to be withdrawn from the artillery control at any time without the need of further ammunition supply.

Method of Survey.—Each battery survey party will run a line of known direction and of known distance from the base piece of the firing battery to the position picked for the center tank. This data will be reported to the fire direction center and will be plotted on the fire chart in addition to the location of the firing batteries. (See sketches "B" and "C.") The fire direction will calculate the azimuth or base angle on which the center tank would be layed and will report this to the battery immediately.



The battery survey section, under the direction of the assistant executive will place stakes to mark the position of each tank. (See sketch "A.") An aiming stake will be placed so that each tank will be layed on the direction determined by the fire direction center. The tanks will be placed 50 yards apart in a staggered line. The tanks may be spotted in front of or to either side of the battery, but because of the flat trajectory they should not be located in rear of the battery. All stakes will be marked for

night occupation. One stake for direction and two stakes for position of tank. Upon arrival of the tanks, the assistant executive will meet the platoon commander and will assist him in placing the tanks and laying the guns. He will also furnish cards showing the schedule of fires to each tank commander.

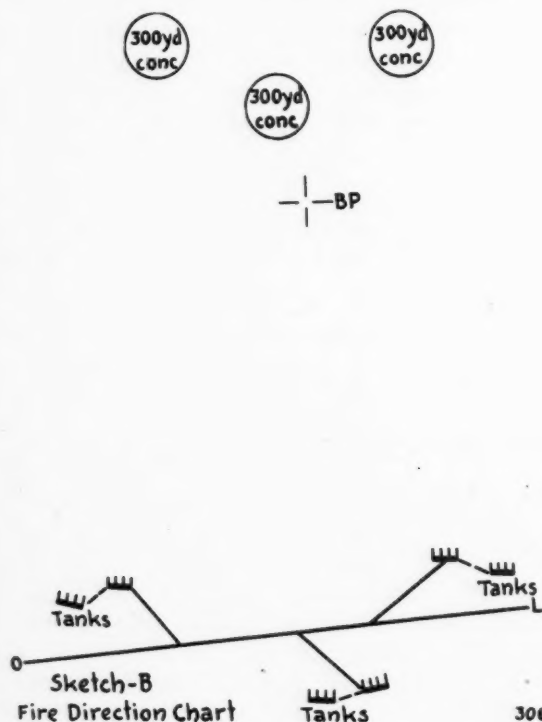
The Assistant S-3 will make up the schedule of fires for the tanks attached to the battalion, the fire direction center designating the area or targets to be fired on. The assistant S-3 must consider that the tanks will be layed parallel with a deflection of zero in the initial direction.

SCHEDULE OF FIRE CARD FOR ONE TANK.
TANK No. L (RIGHT TANK)

Concentration No.	Time to open fire	Rounds per minute	Total rounds	Deflection	Quadrant settings*
1	0815	2	4	18	1st Rd..... 96.6 2nd Rd..... 97.9 3rd Rd..... 99.2 4th Rd..... 100.5
2	0835	2	4	6380	1st Rd..... 102.3 2nd Rd..... 103.6 3rd Rd..... 104.9 4th Rd..... 108.2

* This may be one elevation as dispersion may give the desired results.

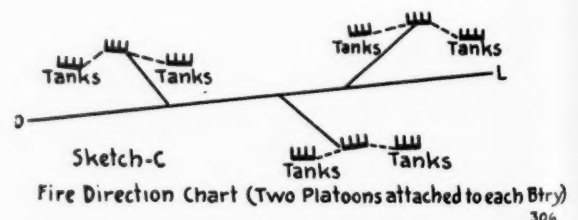
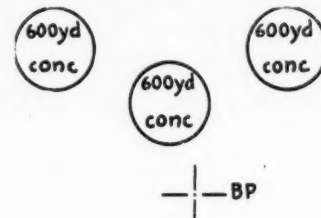
Coordination of Fire.—Each platoon commander will synchronize the tank clocks of his platoon. At the time indicated by the schedule of fires each tank commander will open fire without further command. He will strictly adhere to the time given for the opening of fire for each concentration unless otherwise instructed by the platoon commander.



Notes to Fire Direction Center.—The fire direction center may decide to adjust the sheaf of the tank guns. If so, the proper deflection from the stake must be given to each tank on the schedule of fire card. The azimuth indicator is graduated (down to each mil) from 0 to 6400 mils in a clockwise direction. Therefore if the tank gun is to be fired 50 mils to left of the aiming stake it would set a deflection of 6350 mils.

It may be necessary to adjust one of the tank guns to determine the correction in deflection and range. If such is the case one of the forward observers will adjust the fire of one of the tanks while the assistant executive sets the correction at the tank. These corrections will be incorporated in the schedule of fires. (See notes to platoon commander.)

Notes to Platoon Commander.—If the tanks are not equipped with azimuth indicators but are supplied with quadrants the guns may be fired on an area target with this method by setting deflection with the number of turns of the traversing hand wheel.



Each turn of the hand wheel will traverse the gun 14 mils. If the deflection desired is 50 mils left of the aiming stake measure $3\frac{1}{2}$ turns to the left from the stake. ($14 \times 3\frac{1}{2} = 49$ mils.)

The method is not as accurate as when the azimuth indicator is used but would enable you to place fire on the area. If this method is used the schedule of fire card should show the number of turns of the hand wheel and the direction the gun is to move from the stake instead of the deflection. Example: Left— $4\frac{1}{2}$ turns.

Development of Combat Intelligence

COLONEL JAMES F. HOWELL, *Coast Artillery Corps*
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A previous article, published in the Military Review, May 1943, contained a discussion of the first four steps in the development of combat intelligence.

WHEN contact with hostile forces is imminent and during combat, the search for information must be intensified. The bulk of information collected by the division comes from subordinate and supporting units. Of course the information available at the headquarters of higher and adjacent units should be sought and utilized but most of the information of vital importance to the division during battle is furnished by the component parts of the division itself.

During this period, battle reconnaissance must be carried out continuously by the units in contact so that the division can survive on the battlefield. When reconnaissance is not continuous, when units in contact down to and including the platoon do not conduct reconnaissance, disaster in the form of a surprise attack or an ambush may result.

The truth of these two facts has been proven on numerous occasions in the present conflict but perhaps two examples may serve for emphasis.

The British, in the battle preceding their withdrawal to El Alamein, violated the doctrine that reconnaissance must be continuous. There, the British armored forces attacked a German panzer division causing the latter to withdraw. Disregarding reconnaissance, the British accelerated their pursuit. The panzer division withdrew behind the protection of German 88-mm antiaircraft guns effectively concealed. The British barged, head-on, into the withering fire from these weapons. Simultaneously, their rear was attacked by a second panzer division. As a result of this battle the British lost 80% of their medium tank strength and withdrew from El Agheila to the El Alamein Line.

The second example occurred at Kassarine Pass last February. There, the Americans of a certain combat command, after fighting a very creditable battle, stopped a daylight attack by elements of the *Afrika Korps*. The hostile forces retreated, leaving our forces on the position. The advantage thus gained at considerable loss of life was thrown away carelessly by our forces. They neglected the basic fundamentals of reconnaissance and security to such an extent that a night attack by Rommel found them unprepared. Their positions were overrun and Rommel continued to within a few miles of Tebessa before he was finally stopped.

These examples, a few of many, should emphasize the necessity of battlefield reconnaissance.

Aside from battlefield reconnaissance, the division commander has many other sources of information within the division that should be utilized. Every individual within the division is a potential source of information that should not be neglected. The possibilities of obtaining information from special staff officers have not been thoroughly explored in any unit. Take, for example, the division surgeon. He is not normally considered as an intelligence agency but he may have just the information a division G-2 is looking for. Examination of enemy wounded may give indications as to whether the hostile forces are well or poorly fed, which is important information as it may indicate the effectiveness of our efforts to cut the hostile supply lines. Examination of wounds inflicted on our forces may indicate whether the enemy is using different weapons or projectiles than previously. These and other facts would be most valuable to a division G-2. Similarly, every other special staff officer should be exploited as an intelligence agency.

NECESSITY FOR TRAINING

If we accept as premises that battlefield reconnaissance is a necessity and that every individual within a division, particularly a special staff officer, is a potential source of information, we draw the obvious conclusions that subordinate units must be trained so they can conduct reconnaissance at any time and that all individuals in the division must be trained to recognize and report military information.

The responsibility for this training rests with the unit commander. Special units whose primary mission is gathering information and infantry units down to and including the platoon must be trained so that they have qualified personnel available at all times to perform the reconnaissance mission. Since reconnaissance is continuous, this personnel must be prepared to operate by day or night. Infantry must be thoroughly trained in the subjects of scouting and patrolling and they should complete this training prior to arrival on the battlefield. The training must be realistic and the fundamentals stressed. How, for example, can the leader of a reconnaissance patrol be expected to move three miles in rear of hostile front at night and return to his unit if he has never been trained to operate at night over unfamiliar terrain, or how can the patrol be expected to report the caliber and type of artillery in

a column if the members have not been taught to recognize the various types?

Time for this fundamental training must be allotted to the subordinate units by the division commander. It is to his and every subordinate unit commander's advantage to see that this time is allotted because, aside from other losses involved, many officers in the current war have lost their commands because their troops were not properly trained to conduct effective reconnaissance.

The need for trained interpreters of aerial photographs in the division G-2 section is becoming more and more apparent. If possible, every division should send two or three men to school for this excellent training.

It was indicated that every individual in the division must be trained to recognize information and report it to the nearest headquarters. Much information is gained from this procedure. Subordinate commanders should be particularly careful that they do not treat such reports in a trivial manner. Such action will tend to stop a flow of valuable information. The same principle applies to intelligence officers of higher echelons when dealing with intelligence officers of lower units.

The special staff officers present a different case. Current regulations prescribe that G-2 and these officers work together with reference to certain matters, as in case of captured material. In addition, G-2 should make it his business to discuss with each individual staff officer the problem of collecting information and together they should explore potential possibilities of fitting the particular staff section into the G-2 system.

COLLATION OF INFORMATION

As information is received it is processed through the G-2 Journal, the Work Sheet, and the G-2 Situation Map, and then filed so that it will be available in the future for ready reference, comparison, verification, or interpretation. In connection with the collation of information there are several points to be kept in mind:

The primary mission of G-2 is to keep the commander informed as to the enemy situation and to disseminate military intelligence. If record keeping interferes with that primary duty, then record keeping should be omitted.

When it is practicable to keep records (Situation Map must always be kept), they should be kept up to date; old data is taken off the map and lined out in the Work Sheet. As G-2 will not always be present, records should be kept in an intelligible manner by members of his section so that they may be readily understood.

The importance of these records becomes apparent when considering the transformation of information to intelligence.

EVALUATION AND INTERPRETATION OF INFORMATION

It is in the evaluation and interpretation of information that our field forces are most deficient. Reports from maneuvers indicate that the troops in training have improved considerably in the operation of collecting information but have a great deal to learn concerning evaluation and interpretation. The biggest fault lies in the fact that information received by intelligence officers is disseminated as received without being subjected to these two vital processes. That the steps are vital is beyond question. Information is of no earthly value to anybody unless it has been analyzed with respect to its source and accuracy, and deductions drawn as to its significance in the light of information previously received.* It is this evaluation and interpretation of information that transforms it into intelligence. A jittery G-2 that reports unverified information and rumors eventually loses his prestige and his value to his commander. Despite this basic fact, division G-2's in maneuvers and in combat repeatedly pass on information as received. When pinned down as to why, the answer invariably is the same. It was so important that time did not permit its evaluation and interpretation. Such practice defeats the whole system of combat intelligence which is based on obtaining information, subjecting it to a critical analysis, deducing its significance, and then disseminating the evaluated result. The more important the information, the more rigorous should be its investigation.

Evaluation.—The first step in the evaluation of information is an examination as to its source. Such questions as these will assist G-2 in this matter: Is the individual known or unknown? If known has he been proven reliable or unreliable? Could he, under the conditions stated, obtain the information?

As to the accuracy of the information, does it agree or disagree with previous information and, if at variance, is the new information or the old more likely to be correct?

In practice G-2 either accepts or rejects the information, or he may accept it subject to confirmation. An important point to remember is that certain parts of the information may be accepted while the remainder is rejected. Two illustrations will indicate the procedure of evaluation.

Assume a situation that might have existed in Port Moresby after our forces had established an air base. A radio message is picked up purporting to come from an Australian patriot in the hills of New Britain. The message states that 27 Jap bombers have just taken off from an airfield near Rabaul and are headed for Port Moresby. A fine job for G-2 in evaluation. Examining the source, G-2 might well ask himself these questions: Who is this so-called patriot? Have I had dealings with him before? Have I heard about him? Is it a Japanese ruse? Could he

DEVELOPMENT OF COMBAT INTELLIGENCE

have obtained the information under the circumstances stated?

Searching his memory, G-2 never heard of him. It might be the truth or it might be a ruse. The information could have been obtained under the circumstances since hills overlook the airfield and the Japs are known to have planes at that field. The source must be marked as questionable. As to accuracy, this too is questionable. However, the report is too important to be ignored so G-2 notifies the proper authorities stating the intelligence is questionable and requests that an air patrol be sent out immediately to confirm the report. In this case, G-2 accepts the report subject to confirmation.

Now supposing the raid is accomplished as stated. The reliability of the source is becoming established and future reports from the same source covering the same type information can be given more weight. If a second report is true then the air patrol may be dispensed with in the future. By the same token, if the raid does not come off the credibility of the source suffers. This example was drawn, in substance, from reports sent back from the Southwest Pacific. An Australian, living in the jungle, time after time gave warning of imminent air raids from his vantage post overlooking the Jap airfield. After his credibility had been established his warnings were acted upon without delay and saved numerous lives and much equipment.

An illustration of how information can be furnished from a reliable source, be accurate, and still cause disaster because it was not complete nor properly interpreted:

In North Africa last December, an armored battalion in a combat command had been ordered to withdraw across the river to positions to the west. Two German columns were known to be approaching from the northeast. Two bridges were available for the daylight withdrawal. The armored battalion in question moved to the north to cross over the river on the north bridge. A report was received from reconnaissance elements that two German tanks were on the opposite side of the river. There was no question about the credibility of source or the accuracy of the statement. However, the fact is still information because no significance could be deduced. G-2 should ask himself: What are the tanks doing there? Are they moving? Have they been abandoned? Are they advance elements of German forces moving into the area?

This was not done. The information was passed along as intelligence. The battalion commander acted upon it immediately, ordering a counter march with the intention of using the south bridge. The passage of his own and other units had cut up the road considerably. In due course the vehicles of his unit became bogged down in the mud, so he ordered his battalion to abandon them. The bulk of the vehicles were lost and so was the combat effectiveness of an

armored battalion. The loss of this unit as an effective fighting force can thus be charged to acting on unevaluated information.

Actually there were two German tanks on the opposite side of the stream but, as it so often happens in the desert, they had been abandoned and therefore presented no threat. When this fact is known, G-2's proper course of action becomes plain. He should have taken immediate steps to obtain additional information. Had he taken this action and had the commander awaited the result, the disaster would have been averted.

Confirmation.—Questionable information must be confirmed from independent sources. There is one point that should receive careful consideration. Is the new information confirmation from two different sources, or did it originate from the same source? An illustration as to why G-2 must trace the information to its source occurred in Honolulu shortly after the attack on Pearl Harbor. An infantry observer reported through normal channels that a Japanese warship (incidentally it was proven later the craft was not a warship) was lying off shore. This information was received at Division Headquarters. At the same time the information was disseminated laterally to the Division Artillery who likewise reported to division headquarters. The report apparently having been confirmed by separate sources was disseminated as intelligence. Actually, however, the information stemmed from the same source.

Another common error made by division G-2's is estimating too many hostile units in the area. This is caused by failing to consider movement of a force previously located. Whenever a new concentration is reported, G-2 must take steps to confirm the fact that it is actually a new force and not an old one in a new location.

These examples prove the necessity for evaluation of source and accuracy of information. The conclusions to be drawn are that G-2 must have facts to work with. These facts must be clear as to who submitted the report, what he saw or heard, and when and where the event occurred.

Here again the matter of training crops out. Unless units are trained to report facts they will evaluate the information and pass on the result. The proper procedure would be for each unit to evaluate the information necessary for their own purposes but to report to the higher unit the facts rather than the estimate deduced from the facts. G-2 with the aid of his Work Sheet and his Situation Map is the individual who should evaluate information originating in the division.

Interpretation.—After G-2 has his facts he must then deduce their significance in the particular situation in which the division is involved. Having done this, and not before, the information becomes intelligence and can be disseminated. G-2 must use his office force to do the "pick and shovel" work so he

can do the thinking necessary to deduce the meaning of facts received.

Dissemination.—The military intelligence thus obtained is of little value if kept in the G-2 office. It must be gotten to the individuals who can use it by the fastest possible means—to the division commander if the importance of the information warrants, and to commanders of threatened units. When vital intelligence is obtained, G-2's first consideration should concern getting the intelligence out as soon as possible. Higher, lower, and adjacent units should not be overlooked. G-2 must know his various communications nets and arrange for alternate means of communications. The G-2 Periodic Report and special reports provide additional means of informing higher, lower, and adjacent units as to the situation existing on the front of the division. Information that can not be used immediately is filed away under an appropriate heading until such time as it can be used.

EFFECT ON EEI'S

What effect does this intelligence have on the Essential Elements of Information? It will be remembered that missions and requests for information were planned with one purpose in mind, to get the information the division commander considered vital to the success of his mission. These Essential Elements of Information must therefore, of necessity, bear upon the enemy capabilities. Normally, the answers to the Essential Elements of Information will narrow down the list of capabilities and indicate the line of action the enemy is adopting.

This is precisely the information the division commander must have for the successful conduct of his operations and he must have it just as early as possible so that he can dispose his forces to the best advantage to meet the enemy's line of action. This is the "meat" of our system of combat intelligence; to deduce from facts the *one* of several capabilities that the enemy *is adopting*, not a system whereby G-2 predicts, by some mysterious and unknown power, that line of action the enemy *will adopt*, but a system whereby G-2 explores all the enemy capabilities

and deduces as early as possible the capability the enemy *is adopting*.

In practice, if the Essential Elements of Information have been well conceived and the intelligence missions well executed, vital information will filter back to G-2. The information is then transformed into intelligence. It will be found that the pattern of the hostile dispositions has become clearer and more detailed. The intelligence is then checked against each of the enemy capabilities. Because the picture of the hostile disposition is clearer, G-2 can be more specific as to the conditions, such as time, place, and strength, under which a particular enemy line of action can be carried out.

Most important of all, it will be found that certain lines of action are no longer possible of adoption by the enemy because of failure, on his part, to initiate the action by a critical time. Under the most favorable circumstances, it will be found that the enemy is committed to one single line of action. However, until the enemy is committed to that one line of action, G-2 must continue to investigate all the remaining capabilities.

When the enemy situation is radically changed—for example, by the arrival of reinforcements or by our forces adopting a new line of action—new enemy capabilities must be deduced, a new G-2 Plan must be prepared, and the process repeated. This does not mean that the old estimates, plans, and orders are discarded and a fresh start made, but it does mean that they are revised and brought up to date in keeping with the changed situation.

CONCLUSION

In conclusion, G-2 has a practical job, the performance of which will increase the combat efficiency of any division. The method of producing "Combat Intelligence" as laid down in FM 30-5 is a logical method that will produce results, provided it is followed intelligently. No method of collecting intelligence can be successful unless the operating agencies are thoroughly trained. The responsibility for this training lies squarely in the lap of the division commander.

The principles of war are eternal, but the factors with which they have to deal are undergoing an incessant evolution.

—von der Goltz.

Assault Training

From Material Provided for the MILITARY REVIEW by the Armored Force School, Fort Knox, Kentucky



THE INFILTRATION COURSE

WAR is a dirty business. You can't be a gentleman and stay alive on the field of battle. You must adopt the same dirty tactics the Japs and Jerries are using, and be smarter and better soldiers than they are."

The speaker was the officer in charge of assault training at the Armored Force School, Fort Knox, Kentucky. He was addressing a class of officer candidates about to begin this training on the school's assault course in a mountain valley on the Fort Knox reservation.

The course, among the first of its kind to be constructed in this country, combines the rugged obstacles of northern Kentucky's rolling hills with ingenious man-made aids to training. Visiting officers from other posts have described it as the most rugged assault training course they have seen.

Large numbers of officer candidates and officers in the basic tactics class now are being trained weekly in ruthless, aggressive methods of hand-to-hand warfare. Assisting the officer in charge are the seven officers and 30 men of the Battle Training Section of the Tactics Department.

The students are taught how to kill men with their bare hands. They learn to disarm an enemy soldier, crush his instep, cut his throat, or kick in his skull in a single swift, smooth motion. This training instills confidence, ruthlessness, and aggressiveness in the soldiers, teaches them coordination of hands and

body, and trains them in the methods of employing the hands, knife, or stick to destroy the enemy at close quarters. General theories and principles of balance and the application of strength against weakness, use of kicks and blows and their counters, wrist and hip throws, stick fighting, pistol disarmament, and "come-alongs" are stressed. For instruction, the soldiers are paired according to size, and each pair practices the holds and methods as explained and demonstrated by the instructor from his platform.

This phase is just one of nine in the individual assault training. It teaches the Armoraider to remain a deadly instrument of war after his tank, assault gun, or other chief means of killing are knocked out.

Other phases of the assault training course include the following:

Obstacle Course.—This phase is designed to develop endurance, physical fitness, coordination and agility, to introduce fatigue and mental strain prior to participating in assault training, and to teach the soldier to handle his small arms under adverse conditions. In the course, which is one mile in length, the soldier runs through soft terrain indiscriminately strewn with fallen trees, swims a small stream, negotiates a platform eight feet high and a series of hurdles of log construction three to five feet in height, scales a seven-foot smooth wall,

crawls through 30 yards of barbed-wire entanglement exposed to smoke and explosions, crosses a wire-mesh-covered earthmount seven feet high and an antitank ditch five feet wide, and climbs a hill with a 35-degree slope 200 feet long.

Infiltration Course.—This phase acquaints the men with gun and shell fire and explosions as they will experience them on the battlefield, and teaches them the correct methods of negotiating battlefield obstacles under gun and shell fire. Machine guns are fired to adjust grazing fire 30 inches high before the men are placed in position. To begin this phase, the men starting at the far end of the course drop to the ground upon a signal and advance toward the machine guns. As they advance they encounter trenches with parapets on the side toward the machine guns, slit trenches, barbed wire 13 inches high, shell holes, and fallen trees. Mines consisting of one pound TNT or dynamite are exploded electrically by an operator in a control tower as the men crawl near mine positions. Machine guns maintain intermittent fire until the men reach the last trench. As soon as all the men are in the last trench, they charge over the last parapet and assault simulated antitank guns located in rear of the machine guns. With bullets from three machine guns and two rifles flying directly overhead at a height of 30 inches, the men don't have to be told twice to "keep low."

Village Street Fighting.—This instruction trains the soldiers in street reconnaissance, introduces them to booby traps, and teaches them to handle loaded weapons in the presence of other men. Soldiers, closely supervised by instructors, are required to move through the village for reconnaissance purposes. At the discretion of the instructor, targets are exposed at varying firing distances. Booby traps are exploded by the careless soldier who fails to perform proper observations during his advance. Grenades are employed in reducing strong points, in clearing buildings, and for general noise-making purposes, as desired by the instructors. Movement in the village is rapid when the troops are exposed. Men progress by a series of bounds from cover to cover where they are halted momentarily for purpose of observation, reorganization, and control. An important part of their training is teamwork, separate teams moving down each of the blitz village's three streets.

Battle Firing.—The men are taught to fire small arms in poor visibility (without the use of sights) at surprise targets at close ranges while in a state of nervous excitement. They are required to practice "dry runs" to master battle firing positions which consist generally of a natural crouch with all body muscles tense. On completion of the practice period, they are required to fire a few rounds in what is termed "preliminary battle firing." As technique de-

velops, the shots are made more difficult by staggering surprise targets in depth and elevation. At this point in the training, speed of fire is accentuated.

Woods Fighting.—In this phase the men are taught to advance rapidly and silently through woods, to use natural cover and concealment, and to handle small arms properly, using aimed or battle fire shots as required by the exposure of targets at various distances and time intervals. Three groups of three men each under a leader are formed. These groups work forward through woods in a triangular formation, the three groups forming a triangle, apex to the rear. Each group of three men uses the same formation as they move toward an objective. The leader, who is in the center of the large triangle, directs his men in the capture and destruction of snipers' posts and pill boxes as they are encountered, and gives the signal for the final assault on the objective. Ambush of mounted and dismounted patrols is one variation of woods fighting taught. Advantages and disadvantages of woods fighting should be stressed during this training.

Grenades.—This instruction acquaints the men with construction and use of all types of grenades, whether improvised or issued. Issued grenades of all types are used. Instruction includes sticky grenade, offensive grenade, defensive grenade, and Molotov cocktails. The use of explosives, caps, fuses, and primacord is explained. The men are taught how to construct these grenades from equipment used by troops in the field or easily available in combat areas.

Booby Traps.—Practical training in improvising booby traps from materials obtainable within the company and battalion is scheduled. Instruction should stress simple electrical and non-electrical traps, safety precautions, detection and neutralization of booby traps, and the "come-on" articles used in conjunction with booby traps. A model village is laid out with traps containing small charges of explosive.

Scouting and Patrolling—Ambush.—This training is designed to familiarize troops in the practical use of map and compass, and to teach them the art of ambushing vehicles and patrols, and attacking bivouacs, command posts, and assembly areas. Instruction should include the following: plotting locations, measuring distances, marginal information, use of declination information, contours, orientation, use of compass, dead reckoning by day and night, simple sketches, route sketching, estimation of distances, observation, ambush of mounted and dismounted patrols, ambush of vehicles, use of mines and mine fields, and attack of command posts, bivouacs, and assembly areas.

The assault course trains men to be killers, to "get the enemy before he gets you."

Combined Bomber Attacks

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a Russian article written by Lieutenant-Colonel N. Denison, Soviet Army, for *Krasnaya Zvezda* 11 December 1942.]

THE DETACHMENT of bombers commanded by Captain Savin was cooperating with ground troops which had broken through the defense zone of the Germans on a narrow section of the front. The commander of the infantry regiment attacking here wanted the bombers to amplify with their fire the artillery bombardment of the forward edge of the German defense. In particular it was necessary to destroy the machine-gun nests of the enemy.

At the agreed time some of our bomber elements appeared above the area of the objectives. But an accurate and powerful air attack on the hostile fortified machine-gun nests did not materialize. The bombers of the whole group crossed the area of the objectives at maximum velocity, dropped their bombs one after another, and immediately turned and left for their own territory. A large number of the German machine-gun nests were unharmed. This was repeated twice, after which Captain Savin switched to the execution of the second part of the intended plan, the bombardment of the hostile reserves.

The attack by the rifle regiment was made in its turn. It completed its task. But the machine-gun nests left undamaged by the air force caused the regiment no little unpleasantness. Having taken the designated line and consolidated on the new positions, the troops recalled with gratitude the excellent help of the mortar men and artillerymen. The same, unfortunately, can not be said of the bombers.

Our air force usually effects its direct cooperation with the attacking ground troops by means of incessant air attacks on the forward edge of the enemy's defense, on his combat formations, and also on the immediate rear. Here the basic striking power of the air force, the bombers, undoubtedly plays the decisive role. The success of the whole flight, and consequently of the fire support for the ground troops, depends on how correctly the bombers are directed, how the striking units and their method of use are chosen, and how accurately they cooperate with other types of aircraft. In the above-mentioned incident, the commander of the bomber detachment solved the problem before him in a perfunctory manner. His planes appeared twice above the target area in the first period of the battle. The crews had correctly chosen the type and caliber of bomb. Yet the help expected by the ground troops did not manifest itself. This is explained primarily by the fact that the planes bombed in series on signals from the leaders of the elements, and only from horizontal flight. But the German machine-gun nests to be demolished are point targets. It is very difficult to hit them with certainty by the method of area bombing. In this instance, no doubt, dive-bombing would have produced better results, with each plane aiming individually. It would have been better to take a little more time for the flight. Of course that would mean remaining a little longer in the danger zone. But in the final analysis, war is a matter of risk. For the air force, war is not merely a flight over a target area, but the fulfilment of responsible missions demanding the compounding of risk with skilful, reasoned action productive of not an imperfect, but the most useful effect.

The power of bombing attacks, as combat experience shows, consists in the quantity and weight of bombs dropped on the enemy, and in the method of dropping them. We are speaking not only of accuracy and neatness in bombing (for which all assault personnel should strive), but also of the tactical ways

of using bombers cooperating with ground troops. Naturally there can be no single method which is effective for all combat situations. But the air commander must, under the given circumstances, utilize the varied possibilities at his disposal both on the material side and with respect to preparation of the bomber personnel. Under conditions of contemporary complicated air and ground situations, the bomber unit commanders must be able to organize flights in combinations, and not according to a stereotyped pattern. It is necessary to combine various methods of fire action on the enemy from the air during the whole operation and for each separate flight.

Combined bomber attacks usually represent fire action against the enemy with various types of planes. They operate at various heights on one or several objectives simultaneously with obligatory use of all means and methods of bombing: night attack, in echelon, in horizontal and dive flight, on scheduled time, serially, in volleys, with single bombs, etc. The skill of the command consists in selecting the necessary objective and finding the most effective method of attack according to the situation at any given moment. In turn, the expertness of the crew is determined by how accurately and skilfully they carry out the order of the commander and inflict real injury on the enemy, thus facilitating the operations of our ground troops.

Not long ago a bomber guard regiment was given the task of supporting our attack units from the air. In the area of the regiment's action the Germans assembled a large number of pursuit planes, in order to prevent our daylight flights over the hostile ground troops. Taking this into account, our command switched part of the machines of the guard regiment that same night to knock out the German airdrome. Attacks on the forward edge of the hostile defense were combined with a series of blows by individual machines on the enemy's airdrome. The bombers completed six or seven flights in the night and destroyed the German plan in its inception. That night (as was confirmed by reports from guerrillas) the regiment set fire to about forty planes on the German field airdrome. In the morning the bombers continued to operate on the battlefield, meeting hardly any resistance from German fighters.

Still more convincing is another example, selected from the combat operations of a certain bomber unit. It was active against a German tank group on the flank of our troops. The success of the action was entirely dependent on how skilfully synchronous attacks were combined against the hostile tanks. Covering their mechanized units with a dense antiaircraft fire, the Germans had recourse to a ruse. They scattered the tank units, which had stopped for a rest, very far apart, with two or three machines in groups at large intervals. But the units moving along the roads traveled in ordinary march formation. In order to inflict the greatest damage on the enemy and to disable as much of his matériel as possible, this bomber unit employed a unique maneuver on each flight. One group of planes struck the tank columns of the Germans with serial bombing from horizontal flight. At the same time another group, renowned because of the veteran flier, Major Ushakov, bombed the small groups of tanks which had halted by diving and aiming with individual planes. After a few flights about sixty hostile tanks had been disabled or destroyed. These combined attacks increased the difficulty of hostile antiaircraft action. The latter had to be at various heights and in various directions at the same time. In two days, during which the

bombing unit crushed the German mechanized force, only one plane was lost through antiaircraft fire.

Dive bombing in cooperation with ground troops is one of the most effective methods of attacking the enemy from the air. This is especially true of point objectives on the field of battle. Combining dive bombing, attacks from horizontal flight at medium heights by bombers, and assault action by IL's (type of Soviet fighter aircraft.—Ed.), it is possible to inflict great losses on the enemy with each flight. At the same time our ground troops get more active fire support from the air, particularly as the dive bombers especially are able to strike those objectives which can be destroyed only as a result of a direct bomb hit.

Every massed bomber flight is to a large degree subject to the weather conditions both in the region of the airdromes and in the region of the objective. The present winter conditions of combat flights are characterized by rather abrupt changes of meteorological conditions: sudden snowstorms, fogs, low clouds, etc. Besides that, a covering of snow makes difficult the search for objectives concealed against the background of the locality. To be sure, it facilitates the detection of a whole series of objects which were well hidden by natural shelter in the summer.

In the winter a number of factors influences the organization of bomber attacks, and this demands special flexibility of the air force commanders who plan the combat work of their units in the interests of the ground troops. A broad creative initiative is necessary here, directed toward the maintaining of strength of fire action despite bad weather. Group attacks of whole units of bombers, administered in good weather, must be combined with continual flights of single scouting machines in conditions of snowfall, fog, low clouds, etc. These planes find objectives for themselves and strike them accurately, despite the complex meteorological situation.

A group of bomber scouts has been active now for a long while in the unit commanded by Colonel Tokarev. These planes operate primarily on the method of free search for objectives in a given region. The fliers and pilots of this group are expertly trained in blind flying and know the region of action thoroughly. Before each flight they study the situation at the front in detail, and when in the air they try to deceive the

enemy. If, for example, a scouting plane detects an objective even under conditions of limited visibility, in the majority of cases it does not hasten to attack at once with a few bombs dropped in a hurry. Instead, the scout takes advantage of the poor visibility to hide from view of the enemy, permitting the latter to feel reassured and to gather in groups. Only after some time elapses does the scout approach the objective and attack it confidently with aimed bombs and supplementary machine-gun fire. Making extensive use of combat strategy and being masters of blind flying, the scouts of Tokarev's bomber unit recently destroyed several German echelons and their supplies, set fire to many hostile planes on the airdromes, and dispersed several infantry and motorized columns of the enemy.

In the present offensive operations at Stalingrad, the first days of which were characterized by extremely unfavorable weather conditions, massed bomber action was almost completely eliminated. On the other hand, units of daylight bombers commanded by Majors Boldyrikhin and Smolin repeatedly had recourse to scouting with individual planes. Singly and in pairs, at timed intervals and disregarding a fall of snow, they continued to drop dozens of bombs on the retreating German troops, assisting our units in pursuing the enemy. As soon as the sky cleared a little, whole units of bombers rose into the air instead of single scouts. Such combined attacks helped our ground troops in destroying and capturing the personnel and matériel of the enemy.

There is no doubt that all combined attacks by bombers should be accompanied by the action of other types of planes, assault and pursuit. Cooperation with the latter must be especially carefully organized, in order to avoid excessive losses. However, here also the established pattern should never be followed. Employing in one situation direct escort of bombers by fighters, the commander in another situation can organize combat security by means of prior patrolling by fighter aircraft in the area of the target, or by having the fighter planes meet the bombers along the route or at previously designated lines of departure. While exploring new forms of organization for bomber attacks, it is essential at the same time also to combine methods for their combat security. The more inventiveness and initiative the command displays in this matter, the greater will be the effect of each bombing on the enemy.

The Soviet War Plan

The strategy of the Red Army is subordinated to the Soviet Russian war plan. The war plan means the general line of the conduct of the war as a whole, in relation to the enemy's forces, to the theater of the war, and to the time-table of the war. The Soviet war plan is systematic, purposeful, and efficacious. These are its main features: (1) Preservation of forces for military decisions. In this sense the Soviet war plan is cautious. It is aimed at conserving vital forces whenever possible, not by avoiding battles, as French strategy tried to do in 1939-1940, but by calculating the usefulness of the engagement of forces in every situation. It is aimed at sparing and accumulating forces for the final phase of the war. (2) Protracted war. In this protracted war inflicted

upon Germany, the German Army is to be exhausted, the shift in the relationship of forces in favor of the Red Army is to be attained. (3) Active warfare. The war is planned as an uninterrupted chain of active fighting, of battles, in which highest casualties are to be inflicted upon the German Army. (4) Decisive victory as the goal. Soviet strategy is no less a strategy of annihilation than German strategy. Its aims are the destruction of the enemy's fighting forces, and the total victory, not merely the throttling of the enemy by blockade or by combined naval and aerial warfare. (From an article by Max Werner in the Russian Economic Institute's *U.S.S.R. Economy and the War.*)

Division Field Artillery in the Defense

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IN GENERAL, the mission of field artillery in the defense is to prevent the enemy from launching a coordinated attack, to assist in breaking up an attack should one be launched, and to support the counterattack.

This discussion will consider the defense in one position only.

Selection of Positions.—In order to make the maximum use of the characteristic of flexibility of fire, positions are normally selected so that batteries are echeloned in depth within the battalion in rear of the regimental reserve line. This echelonment is necessary for other reasons also. Some of the batteries are placed in position close in rear of the regimental reserve line in order that they may be able to fire deep into the hostile terrain. All batteries must be able to fire in close support of the main line of resistance and, in addition, the bulk must be able to fire in support of the regimental reserve line. Also, in case of an enemy penetration, echelonment in depth by battery will permit the displacement of the foremost battery to a position to the rear, while the remaining batteries continue to furnish support to the infantry unit. On the other hand, if echelonment were by battalion, the displacement of a battalion to the rear would leave the supported infantry unit without artillery support during the displacement, or that support would have to come from another battalion. This would mean that forward observers and liaison officers would be working with a different battalion and this would be a possible source of confusion.

Classification of Fires.—Basically, there are two types of artillery fires: the concentration and the barrage. The barrage is actually a form of concentration as will be shown later on in this discussion.

A concentration is a volume of fire placed on an area within a limited time. Nearly all artillery fires are concentrations. Exceptions are registration and destruction fires. The massed fire of a light battalion will cover on the average an area of approximately 150 yards in width and of an average depth of 200 yards. That of a medium or heavy battalion will cover an area of approximately 250 yards by 400 yards. Concentrations may also be fired by batteries, but it is preferable to use battalions, because the same volume of fire can be delivered on a given area in a much shorter time by a battalion. Therefore, the surprise achieved is greater.

A barrage is a concentration placed on an area, close to the front lines, which cannot be effectively

covered by the weapons of the supported troops. Barrages are fired by batteries at a single elevation for each battery. In other words, a barrage is fired on a line and has no depth except that which is caused by dispersion. The extent of this dispersion will depend upon the value of the probable error which, in turn, varies with the range.

Barrages are classified as normal and emergency. A battery will have one and only one normal barrage while it may have any number of emergency barrages. The normal barrage of a field artillery battery corresponds to the final protective line of the machine gun. The emergency barrage is designed to help out a neighboring unit.

The locations for the normal barrages of the three batteries of a battalion are decided by consultation between the infantry commander and the artillery battalion commander.

Depending on whether or not artillery fires are planned in advance they are classified as prearranged fires and fires without prearrangement. This planning is accomplished by means of a conference between the supported infantry commander and the artillery battalion commander.

Barrages are always prearranged and concentrations are prearranged whenever it is practicable to do so. Some fires can be prearranged as to location and time, while others can be prearranged as to location only. These latter fires must then be delivered on call.

In spite of advance planning, there will be many fires to be delivered which have not been prearranged. These fires will be on targets of opportunity, which will be reported by forward observers, observers at observation posts, air observers, or by the supported unit, usually through liaison officers. Since this type of fire is based on actual knowledge of hostile targets, it normally takes precedence over prearranged concentrations, which at best, are only good guesses.

The procedure by which fire is secured on targets of opportunity should be of interest to every officer, so that, in the event that the forward observer becomes a casualty, fire can be brought down upon targets discovered during the time required for his replacement to arrive. The method used is as follows: the forward observer will have on his person a map or sketch showing among other things the location of reference points, a base point and some numbered concentrations, some of which can be seen from his location; all that is necessary is to

estimate the distance in yards that your target is from one of these numbered concentrations, reference points or base point and send back over the forward observer's means of communication a command of this form, "Concentration number is 500 right 1000 over, machine guns, will adjust"; when the rounds fall, estimate in yards the deviation of the center of the salvo from the target in direction and in range and send these deviations back. In this manner, fire will usually be brought to the target in a surprisingly short time.

Conduct of the Defense.—Support of the outpost is provided by artillery on the battle position when the outpost line is close to the main line of resistance. When the outpost line is beyond supporting distance of artillery on the battle position, then some artillery is attached to the outpost. When the outpost action is completed, the attached artillery withdraws to previously prepared positions in rear of the regimental reserve line. It will usually revert to division control when it crosses the main line of resistance.

Covering forces will normally operate beyond supporting distances of artillery on the battle position. It is generally advisable to attach both light and medium artillery to such units.

During this covering force and outpost action the artillery endeavors to deceive the enemy as to the defensive dispositions and cause him to deploy prematurely and on incorrect lines.

As the enemy continues his advance, he is kept under fire by prearranged concentrations and fire on targets of opportunity. At the proper time, the counterpreparation is fired. A counterpreparation is a series of prearranged concentrations delivered just prior to the enemy's attack. It is designed to break up and disorganize the hostile attack just before it is launched. Counterpreparations are planned to counter each of the enemy's probable plans of action. They are classified as general and local.

A general counterpreparation is one planned to meet a general attack and all the artillery capable of firing on the threatened front participates.

A local counterpreparation involves only that part of the front threatened by a local attack and normally only the division artillery is employed.

We may expect the enemy to use every means possible to cause us to fire our counterpreparation prematurely, since it will disclose to him our artillery positions and indicate to him which areas to avoid in his attack. Therefore, the order to fire a counterpreparation requires a very important command decision.

If the enemy succeeds in launching his attack, the artillery delivers intensive massed fires against his main attack. It keeps him under fire by concentrations on his attack echelons and reserves. Targets

of opportunity are attacked and special attention is paid to any enemy mechanized elements.

As the enemy approaches the main line of resistance normal barrages are fired on call from the supported infantry. Should the attack penetrate the position, concentrations are fired to disorganize the enemy's attack and to stop its progress.

Artillery support of counterattacks is similar to the artillery support of any other offensive action. Each counterattack plan has a corresponding artillery support plan formulated by conferences between the commanders concerned. If time does not permit the preparation of a complete plan, at least direct support artillery must be assigned to the counterattack unit and the maximum support by general support artillery must be provided for it.

In the defense, artillery fires are prearranged to the maximum and are coordinated both laterally and in depth throughout the sector. It is essential that artillery be held under centralized control, so that fires may be massed on critical areas at critical times. Lateral coordination is obtained by assigning a zone of fire to each artillery battalion. The zone of fire includes all areas upon which the battalion may be called to fire and it may be divided into a normal zone and a contingent zone or zones. The normal zone of direct support artillery coincides laterally with the sector of the supported unit, while that of the general support artillery coincides laterally with the division sector.

Secrecy.—Every effort must be made to prevent our battery positions from being located by the enemy. If he succeeds in locating them, our batteries will not be in action very long. Maximum use must be made of camouflage and natural cover and frequent inspections should be made from the air to observe its effect. During the early phases of the defense when the outpost action is occurring, batteries are fired from positions different from those that will be occupied during the defense of the battle position. Also, during these early phases, roving guns and batteries may be used in order to deceive the enemy as to our artillery strength and locations. Dummy positions will also help to do this. Registration, if permitted, should be made by one piece per battery or battalion firing from a position which will not be occupied during the battle. Battle positions for the artillery should be occupied at the latest possible time and under cover of darkness, if at all practicable.

In conclusion, the attacker will usually be superior in artillery and other means and only by using the means at our disposal as effectively as possible can we expect to stop him. The division artillery officer and his staff should be consulted for advice on any matter involving the employment of the division artillery.

This is a War of Ship Tons

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THIS IS a War of Ship Tons!" So read numerous signs throughout the headquarters of the Army Service Forces in one of our overseas theaters. One need not be a student of World War II to be aware of the fact that ships and shipping are much involved. One can scarcely pick up a newspaper without noting at least one headline relative to ships and their part in the war.

In a discussion of ships and shipping, there are certain fundamental terms that must be understood. One of the commonest of these fundamental terms is "tonnage." Unqualified it may be misleading.

There are four kinds of tonnage that one is quite likely to encounter in a discussion of ships and shipping. These are gross tonnage, net tonnage, deadweight tonnage, and ship tons or measurement tons. The first three relate to the ship itself and the fourth, ship tons or measurement tons, to the cargo which a ship carries.

The gross tonnage of a ship is the entire internal cubic capacity of the ship expressed in "tons" of 100 cubic feet.

The net tonnage of a ship represents its freight earning space. It is the space which remains after certain deductions have been made from the gross tonnage for the propelling machinery space, for shaft trunks, for crew spaces, and for navigation space. Net tonnage is also measured in "tons" of 100 cubic feet.

A graphical presentation of gross tonnage and net tonnage appears in Figure 1.

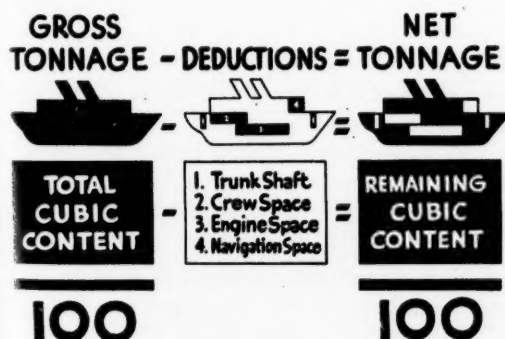


FIGURE 1.

Merchant ships are required by marine law to be listed. This listing is known as documentation. Ships of over 20 gross tons are said to be registered when documentation takes place. Gross tonnage and net tonnage become gross register tonnage and net register tonnage respectively upon documentation.

Both gross register tonnage and net register tonnage are recognized as statistical measures in comparing the development of the various merchant marines. They are used in comparing the amount of import and export trade of a commercial port. Either gross register tonnage or net register tonnage is also used as a basis of taxation and tolls. It is common practice to express ship losses in gross register tons. Ordinarily, the word "register" is omitted and simply "gross tonnage" and "net tonnage" are used. The use of gross tonnage and net tonnage appears to be much more prevalent in Great Britain than in this country.

The third tonnage term, deadweight tonnage, is defined as the carrying capacity of a ship expressed in tons of 2,240 pounds, or in long tons. It represents the difference between the ship's displacement light and its displacement loaded. Displacement loaded is the weight of the ship *including* cargo, passengers, fuel, water, stores, dunnage and such other items necessary for use on a voyage. Displacement light is the weight of the ship *excluding* cargo, passengers, fuel, water, stores, dunnage and such other items as are necessary for use on a voyage. This is illustrated in Figure 2.

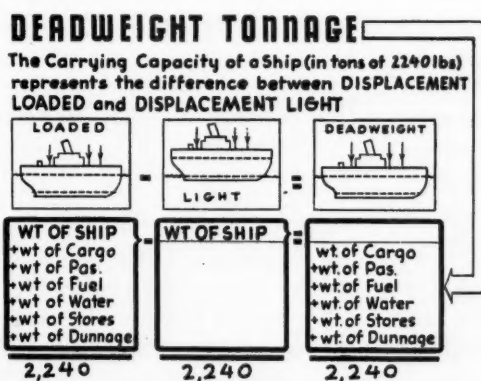


FIGURE 2.

Deadweight tonnage is used in this country almost exclusively to define the size of our ship building program. It should be kept in mind, however, that comparative information as to the size of a ship or of the size of a nation's merchant marine may be expressed in gross tons, in net tons, or in deadweight tons.

There is no absolute relationship between these three tonnages but there is an approximate relationship for freighters. This is illustrated in the following table:

MILITARY REVIEW

Deadweight Tonnage -----	21½	10,000
Gross Tonnage -----	11½	6,000
Net Tonnage -----	1	4,000

Remember, this is an approximate relationship and that there are exceptions to the rule. It means that a freighter of 10,000 deadweight ton capacity will probably have a total cubic capacity of about 6,000 gross tons and a freight earning capacity of about 4,000 net tons. These tonnages are about those of one of our Liberty ships shown in Figure 3.

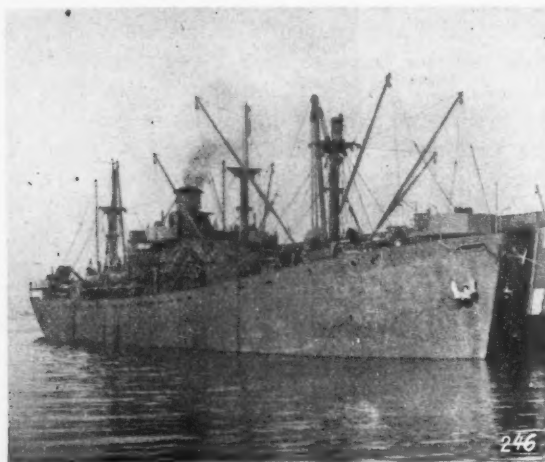


FIGURE 3.

As was stated earlier, gross tonnage, net tonnage and deadweight tonnage define the size of a ship. Ship tons or measurement tons relate to cargo. A ship ton or a measurement ton is simply a unit of cargo measurement expressed in cubic feet instead of in pounds. The ship ton or measurement ton is 40 cubic feet.

With this comment on basic terminology, we will turn to our maritime experience. What has been our experience as a seafaring nation? It has been an experience of ups and downs. With the help of our first and succeeding Congresses, we became the leading seafaring nation in the world by 1815 and continued to hold that position until the outbreak of the Civil War. It was during this period that our Clipper Ships became famous because of their speed. The fastest could make the trip from New York to San Francisco around South America, approximately 14,000 miles, in slightly less than 100 days. At the outbreak of the Civil War, the United States possessed 2,500,000 gross tons of ocean shipping and 95 percent of our commerce was carried in our own ships.

The Civil War marked the end of our maritime supremacy. War losses and sales abroad materially reduced our merchant marine. Problems of internal reconstruction rather than foreign commerce occupied our attention and we became engaged in the development of the West. Little by little our ocean commerce was taken over by foreign ships

while we engaged in building railroads and highways.

The outbreak of World War I in 1914 awakened us to the seriousness of our maritime situation. We had approximately half a million gross tons of merchant shipping of 2,000 gross tons or over and but 10 percent of our commerce was carried in our own ships. At the same time substantial foreign tonnage was withdrawn from our use and we were flooded with war orders from abroad.

In an effort to improve our position in ocean shipping, Congress passed the Federal Shipping Act of September 7, 1916, which created the U. S. Shipping Board. While created to promote the peacetime development of an adequate merchant marine and to regulate foreign and domestic ocean-going ships and shipping, it was destined to become the means by which the Executive Branch of our government was to control ocean transportation during the war. Through agencies responsible to it, it controlled ocean tonnage, took over domestic and foreign ships, administered an insurance system, undertook and consummated our shipbuilding program of that era which resulted, between 1914 and 1920, in 1,911 ships of approximately 13,000,000 deadweight tons. This is equivalent to approximately 8,000,000 gross tons on the basis of the approximate relationship referred to earlier.

Following World War I, our national interest in ocean shipping again lagged. Our ocean-going tonnage became inactive. Ships were sold or scrapped as they became obsolete. Foreign ships again took over the greater part of our ocean commerce. Shortly before World War II began, our merchant shipping of 2,000 gross tons or over amounted to but slightly over 2,000,000 gross tons and less than 25% of the world commerce affecting our nation was carried in our own ships.

Realization of the seriousness of our maritime situation again brought forth Congressional action. The Merchant Marine Act of 1936 established the U. S. Maritime Commission in place of the U. S. Shipping Board. Suffice to say here that this act defines our maritime policy to foster the development and to encourage the maintenance of a merchant marine adequate for our national defense and the development of foreign and domestic commerce.

The U. S. Maritime Commission consists of five members appointed by the President by and with the advice and consent of the Senate. While its original responsibilities have been modified by executive order, the Maritime Commission is our national shipbuilding agency. It started in 1936 with plans to build 50 ships a year for ten years or 500 ships by 1947. In 1939 the goal was set at 100 ships a year. In 1940 it became 200 a year, and in 1941, 400 ships a year. In September, October, and November, 1942,

the ships were sliding down the ways at the rate of almost 3 ships a day, and in December, 4 a day. Now 5 ships a day are a reality. The present program calls for a total of 2,300 ships, 23,000,000 deadweight tons by the end of 1943.

Let us compare the ship-building programs of World War I and World War II. The 23,000,000 deadweight tons scheduled for World War II are to be built in 2 years. Slightly more than the 8,000,000 deadweight tons scheduled for 1942 were built. The World War I program covered 7 years and amounted to only a little more than half of the World War II program.

The fastest construction time for a single ship in the World War I program was 7 months and 24 days. The average construction time per Liberty Ship as reported for January this year, for all yards, was 53 days or 1 month and 23 days. This was the 13th straight month that American ship builders have cut the building time for these ships from keel-laying to delivery.

The 23,000,000 deadweight tons, approximately 2,300 ships, to be built in 1942 and 1943, are planned as follows:

- 300 Tankers
- 500 C-Series Ships
- 1500 EC-Liberty Ships.

The C-Series, that is the C-1, C-2, and C-3 ships are the modern streamlined type ranging in size from 6,000 to 10,000 deadweight tons. Their speed varies from 14 to 16½ knots.

The Liberty Ships are mass production ships. They are also referred to as the "ugly ducklings" in contrast to the more glamorous C-Series Ships. The Liberties have a length overall of approximately 441 feet, have 10,500 deadweight tons capacity, a speed of 10 to 11 knots, and cost about \$1,800,000 each.

The other side of the picture, losses due to sinkings, is far from encouraging. The ocean shipping problem has become a United Nations' problem, like the war. Losses of United Nations Merchant Ships for 1941 were reported in the public press at 4,000,000 gross tons. This left the United Nations an ocean shipping pool estimated at approximately 25,000,000 gross tons at the start of 1942. Losses for 1942 have been reported likewise as 1,000,000 deadweight tons a month or between 7 and 8 million gross tons for the year.

But this is not the whole story either. The Axis submarines have succeeded not only in reducing United Nations' tonnage and destroying valuable cargoes, but in delaying shipping as well. This tends to upset our control of ocean shipping in a serious fashion. Our ships must wait for convoys and then proceed at the comparatively slow pace which convoys must maintain.

While the United Nations have suffered severe

losses in merchant ships, there is an encouraging note in that the United States shipbuilding program is gaining headway day by day and will turn out twice as much tonnage in 1943 as in 1942. In the first four months of this year the United States alone delivered into service 536 new merchant ships, totalling approximately 5½ million deadweight tons. More ships were delivered in January, February, March, and April this year than in the first 9 months of 1942.

None the less, it is common knowledge that the Axis submarines still constitute a serious menace to our ocean shipping. This makes it imperative that our existing tonnage be utilized to the fullest possible extent.

In recognition of this, the War Shipping Administration was established by Executive Order No. 9054, on February 7, 1942, to "assure the most effective utilization of the shipping of the United States for the successful prosecution of the war." In keeping with the necessity of expediting action, control is placed in the hands of a single Administrator, instead of in a Commission of five as was the case in the U. S. Maritime Commission.

The seven major responsibilities of the War Shipping Administratives are as follows:

1. To control the operations, purchase, charter, requisition, and use of all vessels under the flag and control of the United States, except those of the Army and Navy.
2. To allocate these vessels for use of the armed forces, other government agencies, and governments of the United Nations.
3. To provide war risk insurance.
4. To establish conditions for holding ship warrants.
5. To represent the United States in dealing with the British Ministry of War Transport on the Combined Shipping Adjustment Board and with similar shipping agencies of the United Nations.
6. To maintain current shipping and ship construction data for use of all interested governmental agencies.
7. To keep the President informed regarding the progress made in carrying out the Executive Order.

All of the foregoing responsibilities are self-apparent from their statement, except possibly the one referring to "ship warrants." Under provisions of the Ship Warrants Act, a ship is furnished priority in the use of shore facilities, such as stevedoring, repair of ships at shipyards, fueling, and tugboat service, in return for its cooperation with War Shipping Administration. This gives the Administration a strong control over the routing of ships. While a ship is not compelled to obtain a warrant, it frequently gets nowhere in loading or discharging cargo without one. It is reported that the cooperation of ships is good.

It would appear, then, that our plan to control ocean shipping is well grounded. We have the Maritime Commission and its enormous shipbuilding program and the War Shipping Administration to assure the most effective utilization of our ocean tonnage. It is not all smooth going, however. We have already recounted the serious effect of sinkings in offsetting new construction. At the same time demands for ships are steadily increasing and most effective utilization of our ships becomes a complicated problem.

The Army already has an A.E.F. of more than one million men to maintain in many and scattered sectors of the world. This creates an enormous transportation and maintenance problem which necessitates many ships.

The Navy with its enlarged convoy operations needs more auxiliary ships for its supplies. Supplying the United Nations, notably Russia and Great Britain, with war materials and Lend-Lease goods requires still additional ships. Also our own needs for strategic raw materials cannot be neglected.

Then there is the demand for ships which comes from the importance of maintaining friendly relations with the Latin-American countries through the medium of patronizing their markets and supplying them with the things they need.

All these demands for ships are backed by powerful and important divisions of our government (Figure 4). The Army and Navy are each represented by a member of the President's Cabinet. The Department of State, which is concerned with our political relations with Great Britain, Russia, and the

carry out its responsibilities it must influence the allocation of our ocean shipping.

The Office of Lend-Lease cannot function without ships. Goods in America are of no use to our friends across the seas.

In addition, we must obtain certain strategic raw materials, chromium from Turkey, jute from India, and copper from Chile. The War Production Board is the champion of our effort to obtain strategic raw materials and is another contender for ships.

Not only are there demands from our Army, Navy, Department of State, and numerous governmental agencies for ships, but there is an international demand as well. In this group fall the Combined Chiefs of Staff, the Munitions Assignment Board, the Combined Production and Resources Board, the Combined Food Board, the Combined Raw Materials Board, and the Combined Shipping Adjustment Board. All of these are joint boards or committees of the United States and Great Britain. Except for the Combined Shipping Adjustment Board, all of these international boards and committees affect the demand for ships in some way or other.

The place of the War Shipping Administration in our control of ocean shipping has already been referred to. Great Britain has a similar agency known as the British Ministry of War Transport. The British Ministry of War Transport has representatives in Washington and in the cities where our principal ports of embarkation are located. It is concerned primarily in this country in furthering the interests of British shipping. It is the purpose of the Combined Shipping Adjustment Board, referred to in the previous paragraph, to coordinate the work of the British Ministry of War Transport and the War Shipping Administration.

International boards and committees undoubtedly unify our efforts toward winning the war and much is achieved through them. However, they deal with the big aspect of the problem. From them come the basic principles which are to govern the actions of those who actually do the work. By way of illustration, let us assume that the War Shipping Administration has 20 ships at its disposal as of a certain date, from all sources including the Combined Shipping Adjustment Board. To put these ships to work where they are most needed is the War Shipping Administration's job. To help do this, the Transportation Control Committee, with the following representation, comes into play:

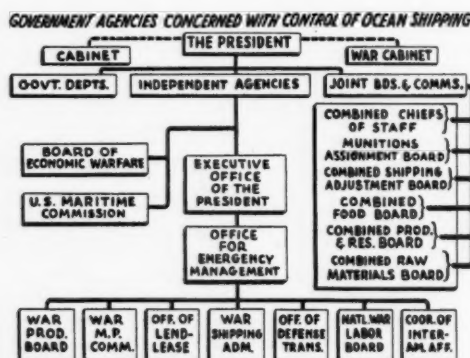


FIGURE 4.

Latin-American countries, is also represented by a member of the President's Cabinet.

Then there is the Board of Economic Warfare. This board was established to protect and strengthen our international relations in the interest of the successful promulgation of the war. It quite naturally is involved in the demand for ships.

The Office of the Coordinator of Inter-American Affairs is concerned with our cultural and commercial relations with the Latin-American countries. To

War Shipping Administration
 War Department, represented by the Chief of Transportation
 U. S. Navy
 Office of Defense Transportation
 British Ministry of War Transport
 Any other government agency wanting ships.

This Transportation Control Committee meets as frequently as necessary to consider the requirements for ships as presented by the members of the Committee. Of the 20 ships to be available on the specified date, the Army might be allotted 13, with the provision that so many tons of Lend-Lease material are to be included. The British Ministry of War Transport might be allotted 2 ships and the Navy the balance. At the same time the matter of convoys would be discussed and as definite as possible preliminary plans made. The War Shipping Administration does the assigning of ships. The Committee is merely an intelligent means toward most effective utilization of the ships available.

The Office of Defense Transportation is represented on the Committee because one of its activities is to coordinate domestic traffic movements with ocean shipping. It issues transportation releases which control inland shipments to the coast. Its authority also includes coast-wise and inter-coastal shipping, which frequently requires coordination with trans-oceanic shipping.

So much for the ever increasing demand for our ocean tonnage. There is another important factor with which we must reckon and that factor is the matter of distances involved in transporting our troops, in supplying the United Nations, and in obtaining our own strategic raw materials. Our ships are actually sailing all over the world in World War II. The average round trip in World War II is 15,000 miles as compared with 6,000 miles in World War I. We have troops to maintain in Greenland, Iceland, the British Isles, in South America, Africa, Iran, India, and in the Pacific Islands. The distances involved, 3,000 miles from our east coast to Great Britain, 6,000 miles from our west coast to Australia, and 12,000 miles from our east coast, around Africa, to Iran and India are just so many numbers until we translate them into sailing time. A 6,000-mile round trip will take in the vicinity of 60 days, not more than 6 trips a year for a ship. The 12,000-mile round trip to Australia will require approximately 4 months, not more than 3 trips a year for a ship. The 24,000-mile round trip from our east coast around South Africa to Iran and India will require 8 months. A ship can make but 3 such trips in two years. Now that we have control of the Mediterranean, the time for this journey will be cut in half.

Great Britain will gain still more. It is estimated that Great Britain, by sending her ships through the Suez Canal to Red Sea ports instead of making the journey clear around Africa, will gain an equivalent of 200 new ships a year.

We have already pointed out that control over ocean shipping involves both building and effective use of ships. Many elements enter into most effective control of shipping. Controls have been devised for every conceivable adversity, even though they may not be completely effective all the time. There is

the Maritime Commission to build the ships. There is the National War Labor Board to deal with strikes which might otherwise make costly inroads on the ship-building program. There is the War Manpower Commission to come into the problem, should the need for workers in the ship building industry become greater than the available supply. Sinkings, while being far from under control at present, are being dealt with. Every day our resources to meet this situation are becoming stronger.

The machinery for allocation of ships seems to be working. Here we have the War Shipping Administration and the Combined Shipping Adjustment Board, and Allied Boards and Committees.

Goods ready for overseas shipment must, in most instances, be moved from some inland production center to a port of embarkation. There is an agency of control here also. The Office of Defense Transportation provides the releases, without which the inland transportation of the goods could not be effected, and through which a balance is maintained between tonnage moving to a port and the cargo space available there.

It remains to load the ships so as to utilize their cargo space as completely as conditions will permit and then move them as rapidly as possible from port to port. Loading and unloading must be handled with dispatch. Nothing is gained in rushing ships to port if they must wait for loading or unloading, or in failing to load and unload up to the limit of available facilities.

Two other links in the chain of control are devoted to this phase of the problem. They are the Port of Embarkation and the Port Agency. These are Field Installations of the Transportation Corps. Ports of Embarkation control shipment of troops and their supplies.

Port Agencies were created to coordinate and expedite the flow of Lend-Lease supplies. In performing its mission, the responsibility of the Port Agency includes the following:

1. To prevent congestion within port areas.
2. To prevent improper use of ground storage.
3. To assure expeditious and orderly unloading and release of railway cars.
4. To assure proper loading of cargo in accordance with existing priorities.
5. To assure expeditious and orderly loading of ships to achieve a minimum of time in port for each vessel.

Two of these responsibilities fit very definitely into our chain of control. More tonnage can be made available than is realized at first thought by assuring proper loading of cargo and by expeditious and orderly loading of ships to achieve a minimum of time in port for each vessel.

Steps are being taken to stretch our ocean-going tonnage still further. Trucks and planes are now being shipped "knocked down" wherever there are assembly facilities at the destination. This enables us to make still more effective use of our limited cargo space. And further, in some instances, troops are slept in relays where the ships have sufficient messing capacity to provide food and water for the additional men.

There seems little more that can be done to extend the utilization of our shipping. Imports have been reduced until we are rationing our sugar, coffee,

gasoline, and fuel oil. There are no longer enough tankers to provide gasoline for pleasure use and war needs. War needs must come first.

When we have exhausted all means that we can devise to assure the most effective utilization of our shipping for the successful prosecution of the war, and still more ships are needed, there seems to be but one thing to do and that is to build them. That is why our shipbuilding program has jumped and jumped again until we are counting on at least 1,500 new ships during 1943. If that is not enough, we must find the way to build still more.

Tanks in Desert Warfare

[An article from the *London Times* as reprinted in *The Tank* (Great Britain) January 1943.]

It is not easy to form an exact picture of an armored attack if one has seen it only, as even a great part of the Army in this country has, in the course of an exercise. An officer of the Royal Armored Corps who is now back in England after having fought in almost all the engagements in North Africa, has given an account of a particular form of tank action, an attack on a prepared position carried out in cooperation with infantry and with limited objectives.

Such an attack is carefully prepared, if possible with the aid of air photographs to discover the channels. Presuming the minefield to be antitank, with mines which do not explode without a certain heavy pressure, the infantry goes first, followed by sappers with mine detectors. When a lane has been cleared the tanks go through in line ahead.

The officer emphasized the complexity of the squadron commander's job. He has to control his own command in the action; he has to ensure cooperation with the infantry through a liaison officer, and at the same time he has to con and fight his own tank. During those brief but exciting and well-filled moments, said this officer, he feels that he is fully earning his pay.

As the tanks go through, hostile posts, perhaps within the minefield, will open fire. Instantly a turret will swing around and an attempt will be made to get rid of the nuisance by a burst of fire from the Besa. (Type of heavy automatic gun.—Ed.). If that does not suffice, it will be followed by a few rounds of high explosive from the gun. But there is no time to wait for results or for a deliberate attack.

Once through the obstacle the tanks deploy into two waves or more. The infantry probably moves with the second wave, and the line will be awaiting the tanks, wishing them luck and giving them "thumbs up." The job of the first echelon is to get to the final objective and it must allow no incident to divert it from this task. The second echelon has to ferret

out and dispose of whatever "trouble" is left behind by the first, and there is generally plenty.

When that task has been accomplished it rejoins the first echelon on the objective. By this time the antitank guns are hastening up, and as soon as they are on the scene the tank commander can ask the infantry commander with whom he is working whether he may pull out. The reply probably runs something like this: "Yes, I'm all right now, but for goodness sake don't go too far." That matter being arranged, the tanks probably withdraw behind a friendly ridge for brief repose and refreshments for themselves and their crews.

That is roughly the procedure if all goes according to plan. It may happen, however, that the squadron commander hears of the hold-up of a platoon of infantry on the flank. In such a case he will have to detach and swing round tanks from his reserve—never from his first wave—to put matters right.

An action of an entirely different kind, an independent action, took place just after the British retirement to the Alamein position. A unit of British tanks was moving across the position from north to south when it was attacked by a superior number of German tanks. The fight which developed in this case was extraordinarily like naval warfare, with both sides moving on a parallel course in line ahead (Single file.—Ed.), an unforgettable sight.

The officer remarked that in his experience wireless always worked pretty well except when a shell-burst blew the fuses. "Clear" was always used in action to describe the enemy's movements; code if it was necessary to describe one's own. He spoke of the German forward observing officer rapping out his targets and ranges over the wireless, as one of the worst nuisances. "You tell him with oaths to get off the line, but he will keep on interrupting."

Preparation of an Air Unit for Overseas Movement

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Instructor, Command and General Staff School

THE PURPOSE of this article is to present a general picture of some of the things which have to be done when an air unit prepares for overseas operations. I shall confine my remarks to the preparation of a heavy bomber group, stressing that which is to be done in preparation of the combat crews rather than of the whole unit. If one can get the picture of what preparation is required for a heavy bomber group, he will have a picture of the preparation for any air unit, because the procedure is similar. For purpose of illustration, let us begin the discussion of the preparation of this heavy bomber group by beginning at the end of the final phase of the operational training at one of the operational training bases—say at “A.” The ground echelon and the air echelon, less the combat crews and key members of the group and squadron staffs, go to a final staging area near the port of embarkation. The combat crews plus the key members are sent by air or rail to “B” where they come under control of the “X” Bombardment Wing for a two weeks period during which processing is conducted for the purpose of preparing the combat personnel for movement into combat zones. It is not the purpose of this wing to make up deficiencies in training which should have been accomplished in the former phases of operational training.

I shall refer to these combat crews plus the key members of the group and squadron staffs as the “Tactical Group.” This Tactical Group will be attached to the “Y” Heavy Bombardment Processing Headquarters (Provisional). This Provisional Headquarters functions as an agency of the commanding officer of the “X” Bombardment Wing for processing and checking the Tactical Group in accordance with the wing directive. The Tactical Group Commander assists the Processing Headquarters in carrying out this directive. The processing at “B” is divided into seven phases, namely:

1. Inspection.

(Includes that portion of the supply and medical phases which pertains to the individual's clothing and equipment; checking and bringing up to date the immunization register; physical check; and a spectacle check.)

2. Intelligence.

3. Operations.

4. Communications.

5. Supply.

6. Engineering.

7. Medical.

Immediately upon arrival at “B” the combat crews are taken to the inspection building where they are given a complete “shake-down” as shown below.

INSPECTION PROCESSING

Inspection Processing is divided into six steps as follows:

Step No. 1—Billeting.—Crews are billeted and their baggage is tagged with the designation of proper quarters. Officers sign Base Register. Each crew member gets Processing Check Sheet.

Step No. 2—Supply Inspection.—There is a table in the main inspection floor for each member of the crew, marked Pilot, Co-Pilot, Navigator, etc. Two inspection members are located at each table. Each member of the crew goes to the proper table with his baggage, where it is opened and inspected. Individual equipment and supplies of the crew are checked for shortages. Baggage is then repacked and trucked to the crew's quarters. Each member is allowed 40 pounds of personal equipment and 60 pounds of flying equipment including the parachute. The 40 pounds of personal equipment does not include what one can put in his pockets to be counted against his personal weight, which is more or less unlimited because each crew member is figured at 200 pounds.

Step No. 3—Personnel Office No. 1.—Each individual is checked to see if he has executed a will and power of attorney. If he has not, he is urged to do so. Of course this is not mandatory. If a member does not want a will or power of attorney he signs a form stating such information.

Some interesting stories are brought to light when questioning personnel about wills. It is found that some of the young members who have been married for a couple of weeks or a month dislike making a will. They say: “Why should I leave my wife with a lot of money, because she will go and get married right away anyway and spend my money on some other guy!” In other cases the young member asks that a clause be put in his will that any money he leaves his wife be taken away from her in case she remarries.

Bachelor Officers' Quarters charges are collected two weeks in advance and enlisted men's mess tickets are issued.

Step No. 4—Personnel Office No. 2.—In this step all members of the crew are required to read a directive as to Security Discipline covering, for example, the fact that they cannot talk about the place to which they are going. Each one signs a certificate that he has read this directive. Trained clerks determine what remains to be done from the personnel and administrative standpoints, such as:

1. Service Records are checked for completion.
2. Emergency addressee cards are filled out.
3. Pay data card is brought up to date.
4. Qualification card is checked for completeness.
5. Designation of beneficiary is filled out.
6. Individuals are checked on the amount of insurance they carry and are urged to take out the government life insurance. Also they are checked on their allotments.

7. Possession of A.G.O. Form No. 65-1, Officers Identification Card, is ascertained. Should an officer not possess one, he is photographed and the necessary procedure accomplished to furnish him a card before departing from "B."

8. Members are urged to sign up for war bonds.

9. Each officer is checked to see if he has several copies of his active duty orders, personnel orders authorizing flights, orders announcing ratings, current travel orders, and statement of service for longevity pay.

10. Each member of the combat crew must have copies of his organization's special order designating him as a member of a combat crew and placing him on flying status.

Step No. 5—Medical.—This is a brief check by the Flight Surgeon, including a venereal check. Immunization records are checked to determine what inoculations are required. All individuals wearing glasses will have one extra pair in their possession and the prescription entered on W.D. M.C. Form 81. Blood is typed for dog tags if necessary and new up-to-date tags supplied where needed. A dental check-up is made and necessary work accomplished.

Step No. 6—Clearance.—In the Clearance Section the individual picks up his will, power of attorney, and other papers which he did not have when he entered the building but which have been made out while he was going through the inspection processing. Professional witnesses are on hand to sign wills or powers of attorney.

Finally, the individual is given a clearance to leave the building. When he leaves, all deficiencies and shortages have been corrected or arrangements have been made for their immediate correction.

This Inspection Processing Building is very well laid out. Once a crew member enters the building he cannot get out until he has gone through all the steps. There is a post office in this building which handles all the mail for transient crews. A lounge

of the U.S.O. variety is set up in the building for the purpose of giving the men comfort while waiting their turn to be processed.

To relieve the pressure of paper work from the "Y" Heavy Bombardment Processing Headquarters (Provisional), to which all Tactical Groups are attached, a combat crew headquarters is set up in this Inspection Processing Building to do all the administration for the Tactical Groups. This headquarters has a permanent commanding officer, 1st sergeant, and the necessary clerks.

INTELLIGENCE PROCESSING

The purpose of intelligence processing is to familiarize combat crews with the overseas flight routes and the various theaters of operations, and to condition them mentally for actual operations. The crews are briefed on all the routes and not any particular route until they actually reach the point of embarkation. During Intelligence Processing the combat crews are examined to determine their ability to identify enemy fighter aircraft and enemy surface vessels. They are brought up to date on enemy equipment, customs and characteristics of the people in the various theaters of operations, and political, geographical, and climatic conditions prevailing. Also the necessity for strict security discipline is repeated and forcefully impressed at all times. Personnel from the Air Transport Command Ferrying Division are used to furnish the principal portion of the briefings so as to secure complete, accurate, and current information upon all phases of the overseas flight drawn from recent experience. Also, it is the policy to arrange talks and discussions by personnel recently returned from combat in the various theaters of operation.

Personnel are informed as to the amount of money which can be taken and are instructed on how to obtain foreign currency.

OPERATIONS PROCESSING

This phase is to determine any deficiencies in the pilot's instrument flying ability, the navigator's ability, the radio operator's proficiency, and the bomber's knowledge of equipment.

When the weather permits, the pilot is given a minimum of two hours actual weather flying in addition to an instrument check. The instrument check includes blind take-offs, stalls and orientation, beam-work, let down, and blind landing approach.

The navigator will successfully accomplish a day-time dead-reckoning navigational flight of at least 1,000 miles over water, and also a night celestial navigation mission of at least 750 miles over land or water. Estimated time of arrival must be within five minutes of actual arrival.

Pilot, navigator, and radio operator, as a team, demonstrate their proficiency in working QDM (radio) procedure.

PREPARATION OF AN AIR UNIT FOR OVERSEAS MOVEMENT

Each combat team participates in at least one hour of high altitude (25,000 feet) formation flying.

The radio operator demonstrates his operational proficiency and his ability to act as a competent operator with a crew. He must be able to send and receive fifteen words per minute in cipher in the air.

The pilot personally checks the fuel consumption of each engine on at least one five-hour mission using long range cruising data.

All instruments are calibrated on the ship.

All bomb-racks and machine guns are tested. Guns are tested above 20,000 feet. Racks are tested on the ground.

Pilot and co-pilot demonstrate their ability to send and receive five syko words per minute using the Aldis lamp.

The complete crew is instructed on the abandon-airplane procedure and dinghy drill (rubber boat drill) and each crew actually checks operation of release and inflation of the life raft.

Each man on the combat crew fires sub-machine guns, pistol, and rifle, and does a little skeet shooting.

Each man participates in five hours per week of physical training.

COMMUNICATIONS PROCESSING

The purpose of this phase is to check the competency of combat crew radio operators and to familiarize pilots, co-pilots, and navigators with the form of communications to be encountered in flying to overseas destinations, and with the briefing procedures employed at dispatch points prior to departure for overseas bases.

SUPPLY PROCESSING

The purpose of this phase is to determine shortages of combat crews and airplanes and to make the necessary issue.

ENGINEERING PROCESSING

The object of this phase is to insure that the airplanes are fit for combat duty and are fully equipped for over-water flights, and that loading charts are furnished for each airplane.

The combat crews arrive at "B" without their airplanes. Airplanes are brought from the modification plants to "B" where they are turned over to their crews ready to go across.

MEDICAL PROCESSING

The purpose of this phase of processing is to determine the medical condition of all the combat crews and to fill all shortages of medical equipment. Each individual receives the necessary inoculations, vaccinations, and dental care. The crews are briefed on the hygienic measures and dangers peculiar to the various routes. They are given instructions in the use of medical kits, in first aid and sanitation, and in preventive medical care to protect themselves and those under their command from various diseases and dangers in the theater of operations. Also, they are given instruction in how to render proper and efficient first aid to themselves and members of their command when medical personnel are not available. Each member is given a medical examination for foreign service. During this process attempts are made to discover the state of morale of the individuals.

At the end of this processing period the Tactical Group departs for a port of embarkation where the crews are given final briefing on the route over which they are to fly. The ground echelon and the air echelon, less the combat crews, which go from "A" to the final staging area near the port of embarkation receive processing very similar to that received by the combat crews at "B" so far as administrative and supply matters are concerned—that is, final inspection and issue of equipment is made, all deficiencies in personnel matters are corrected, and training is conducted to bring all individuals to a high state of physical condition before embarkation.

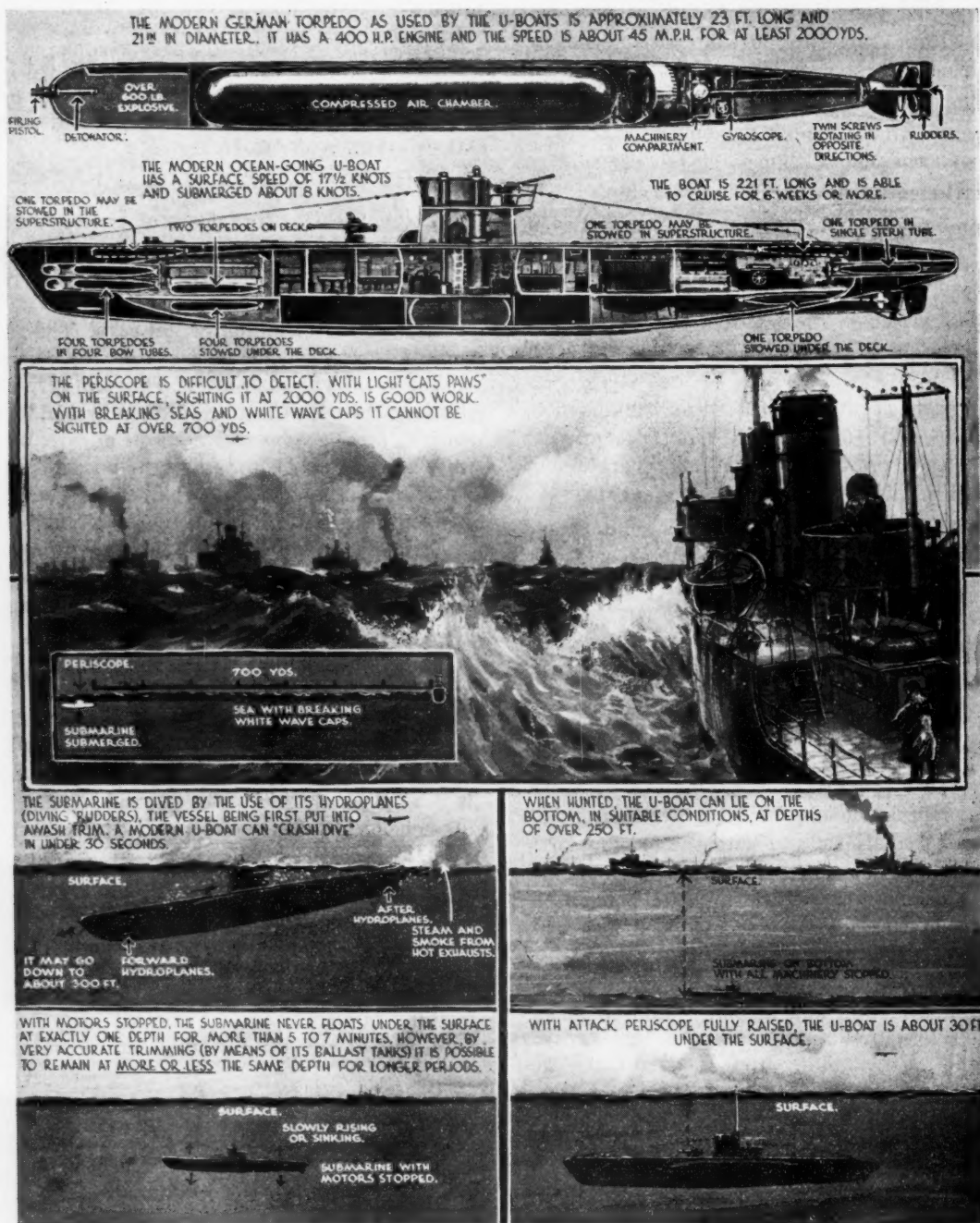
In the future, if we want to control China, we must first crush the United States just as in the past we had to fight in the Russo-Japanese War. But in order to conquer China we must first conquer Manchuria and Mongolia. In order to conquer the world we must first conquer China.

Having China's entire resources at our disposal we shall proceed to conquer India, the Archipelago, Asia Minor, Central Asia, and even Europe.

—Baron Giichi Tanaka: *Memorial for the Emperor of Japan*, July 25, 1927.

The Deadly Menace of the U-boat: The Power and

Drawn by G. H. Davis, Special Artist



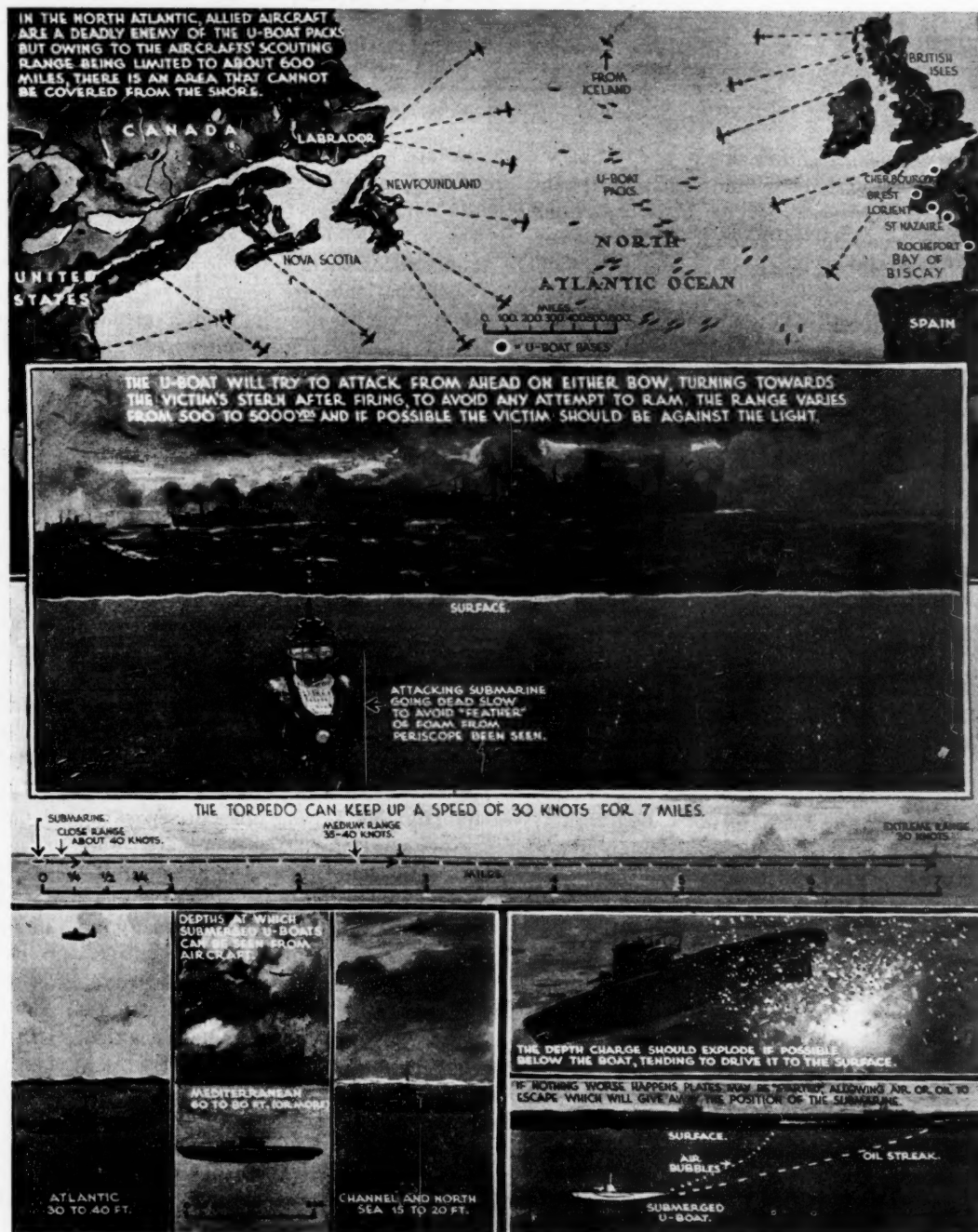
The Modern U-boat Fires a Powerful Torpedo, Whose Accuracy and Range are Very Great, Some

Although the ever-present and deadly menace of the U-boat has constantly formed the subject of warnings from official quarters in this country, it is only latterly that the American people have come to realize its true dangers. During the last few weeks many United States speakers have stressed the great threat which Germany's underwater wolf-packs constitute to the United Nations' war effort. On February 6, Colonel Knox, Secretary of the U.S. Navy, described the submarine menace as the greatest threat the Allies have to face. The modern U-boat is a very different proposition to its forebear

of the 1914-18 war, as was shown in a series of special drawings in "The Illustrated London News" of January 16. This week we publish explanatory drawings illustrating further details, tactics and possibilities of the modern U-boat, and the greatly increased power of its torpedoes. No counter has yet been found to the modern German torpedo, which, with its high-explosive charge, its fast speed (generated by a greatly improved motor), and its great accuracy and range, can undo the work of thousands of men in one terrible moment. The average U-boat can carry twelve of these tor-

Possibilities of Germany's Underwater Wolves.

for *The Illustrated London News*.



Details of the Operational Methods of Enemy Submarines Working in the Atlantic Shipping Lanes.

pedoes—fourteen if two "reloads" are housed in awkwardly placed receptacles in the superstructure. The strengthened pressure hull of the U-boat of today, combined with welding instead of riveting, enables it the better to withstand the explosive force of depth-charges, and its rapid "crash-dive" arrangements increase its possibilities of escape from avenging surface vessels and aircraft. Unfortunately, the hitting power of U-boat-hunting aircraft is limited by their range of approximately 600 miles, and beyond this the U-boat packs in the Atlantic have only to contend with surface vessels.

With the help of detectors and other secret weapons, these surface hunters are doing excellent work against U-boats, but so far they have been unable to defeat the menace. Another suggested solution is the building of faster merchant vessels. Meanwhile, aircraft of Bomber Command and Fortresses and Liberators of the U.S. Army Air Force stationed in Britain carry the war night and day to the U-boat at its source—the factories and bases in Europe.

—*The Illustrated London News*.

Use of Motor Vehicles of the Infantry Division

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SINCE the earliest military history, "infantry" has meant "foot soldier," and contrary to general belief, "infantry" still means the soldier who walks. It is true that we have a large number of motor vehicles in our infantry division, in which some of the soldiers have a place to ride to battle, but the principal functions of the motor vehicles of the infantry division are supply and evacuation. They have taken over the duties formerly performed by the horse and the mule; to pull the artillery, bring up supplies, and evacuate the wounded.

For purposes of discussion, and in accordance with their general uses, we may roughly divide the motor vehicles of the infantry division into three general groups. In the first group we will place all vehicles and accompanying personnel which serve the division as a whole. This group we will call the division trains. Next we will consider all vehicles and accompanying personnel which serve regiments and separate battalions; these we will call the unit trains. The remaining vehicles are organically assigned to combat units such as companies and batteries. In this category we find prime movers, weapons carriers, command and reconnaissance vehicles, tool trucks, radio and wire trucks. These are not called trains; they are primarily tactical vehicles although many of them have some supply and evacuation functions.

The engineer battalion, medical battalion, ordnance company, and quartermaster company are often listed as the division trains. This is not an accurate statement because the entire engineer battalion, for example, is not a division train. The engineer battalion as a whole is actually a specialized combat unit, but it is charged also with certain routine supply duties for the division as a whole, and the division engineer train therefore includes only the vehicles and specially trained engineer personnel that perform these duties; for example, map supply, supply of engineer entrenching tools and fortification materials for use of other units, and water supply.

On the other hand, almost the entire quartermaster company is properly included as the division quartermaster train. It furnishes the nucleus of the transportation pool for the division, and its cargo vehicles are used for transportation of supplies for the division as a whole, and of course for evacuation of personnel and supplies that can be carried to the rear in trucks which would otherwise return empty.

The bulk of the medical battalion is also properly included among the division trains. Its main du-

ties are the evacuation of casualties and distribution of medical supplies; its collecting companies evacuate the casualties from the aid stations, transporting the wounded by litter, ambulance, or both, as circumstances permit, to the division clearing station, where patients are prepared for further evacuation to the rear; it also distributes medical supplies that it obtains from higher echelons to the entire division utilizing ambulances moving to the front for this purpose.

The mission of the ordnance company is of course the maintenance of all ordnance matériel, which includes motor vehicles, but it also has both supply and evacuation duties. It is responsible for supply of spare parts for use in repair of ordnance matériel, and for evacuation of ordnance and other heavy equipment from the battlefield.

So we may say that in general, the division trains comprise the medical train, the ordnance train, the quartermaster train, and the engineer train. These are the connecting links for supply and evacuation between the division and the next higher echelon.

Now let us consider the unit trains. These are found in the service units of regiments, and the headquarters and service units of separate battalions, and are subdivided into sections according to their several functions; for example, the unit train of an infantry regiment is usually subdivided into the following sections: kitchen and baggage, ammunition, maintenance, medical, and sometimes miscellaneous supply section. The kitchen and baggage section, as its name implies, is composed of the kitchen trucks and trailers which are found organically in the service company, but it also includes the kitchen personnel from all of the companies of the regiment. It procures Class I supplies (rations from the quartermaster, water from the engineer), prepares meals, and feeds the troops. The ammunition section includes not only the service company vehicles assigned to transport ammunition for the battalions, but any other vehicles of the regiment, principally of the regimental headquarters, that operate in resupply of ammunition. Accordingly the medical section comprises those vehicles of the regimental medical detachment which operate in the medical service of the regiment. In the miscellaneous section we find any other vehicles used primarily for supply. In other words we may say that the unit trains are the connecting link between the division trains and the forward combat elements of the division. They are the principal vehicles that operate between the

division service area and the combat area, and that fact necessitates another type of subdivision for the unit trains not based on functional lines as above described but based on the use of the vehicle at a particular time. For this purpose let us adopt the use of the terms "A" trains and "B" trains. The "A" trains of a unit comprise those vehicles and accompanying personnel which are immediately essential to combat. If the division service area is too far to the rear, these "A" trains may be based in a support area in close proximity to the troops they serve, and will travel back and forth between the combat area and supply or evacuation points. On the other hand, the "B" trains are the vehicles that are not immediately essential to combat; these are kept under centralized control in the division service area well to the rear, where they will be out of artillery range, out of the way of movement of combat troops, and will be afforded some measure of protection by distance, concealment from ground and air observation, and mutually supporting areas organized and coordinated for all-around defense. The guiding principal is that every supply and administrative vehicle not actually needed immediately for combat, must be stripped from forward combat areas during daylight and only permitted to go forward of division service area during darkness or when needed at the front.

These division trains and unit trains comprise roughly about one-third of the vehicles of the division. This leaves about two-thirds of our vehicles in the classification of tactical vehicles, but it must be remembered that a great many of these also have supply functions. They carry the weapons, ammunition, wire, and other equipment that is immediately essential to combat and usually remain with, or in close proximity to, the units that they serve; they are the connecting link between the unit trains and forward combat troops.

Now how do these various echelons of supply and evacuation operate? In other words, how is the ammunition transported from the ammunition supply point of the division to the troops in immediate contact with the enemy? First we will consider small-arms ammunition. Initially, we find the individual soldier with some ammunition on his person and a reserve carried in the weapons carriers and prime movers of his unit. We find the ammunition section of the unit train also loaded with small-arms ammunition. When combat is imminent, this ammunition section will be released and will go forward to the regimental ammunition distributing point where it will be broken up into battalion groups and conducted by guides from the battalions to battalion areas. The ammunition vehicles will be conducted as far forward as circumstances will permit. In some cases ammunition will be distributed to the men from the vehicle; in others it will have to be transferred to the weapons carriers of the companies and carried

to the front in these smaller vehicles or by carrying parties. As soon as one of these regimental ammunition vehicles becomes empty, it will return to the regimental ammunition distributing point where the regimental munitions officer or his representative will give it directions to return to one of the ammunition supply points serving the division, obtain a refill, and return to its unit train bivouac, to the support area, or to the regimental ammunition distributing point, depending upon the situation. If it returns to the regimental train bivouac, it reverts to a "B" train status, and will remain there until it is again needed at the front. If it returns to the support area, or to the regimental ammunition distributing point, it may be held until needed or dispatched immediately to that part of the battle where ammunition is most needed at the time. Usually ammunition will not be unloaded at the regimental ammunition distributing point, but will be kept mobile. This location is in reality a guide or control point for ammunition supply; it is the place where the regimental commander keeps his finger on the pulse of ammunition flow to his units. The supply of field artillery ammunition is similar except that there is no regimental organization and supply is effected direct by battalion from ammunition supply point to the gun position. That, in general, is the way our guns are fed, but how do we feed our men?

The ration is received by the division at the supply point (railhead or truckhead) in bulk. How is it broken down, prepared, and transported to the mess kit of the individual soldier in the form of a hot meal? Under the direction of the division quartermaster the ration is first segregated into lots of appropriate quantities for the regiments, separate battalions, and separate companies of the division. It is then transported to the unit train bivouac areas which are found in the division service area. Quartermaster trucks may be utilized for this purpose, or each regiment, separate battalion, or separate company may send sufficient kitchen trucks back to the supply point for its rations. In either event, after the ration arrives in the regimental train bivouac area, it is received by personnel of the service company, and further subdivided into lots of appropriate quantities for each company of the regiment, and these company lots are delivered to the company kitchen personnel who will usually be found during daylight in the regimental train bivouac area. The company kitchen personnel further subdivides the ration it receives into lots for three meals for the company and prepares one of the meals to be served to the troops. Every effort is made to serve the troops at least two hot meals daily. During combat, when a meal is prepared, supper for example, kitchen trucks will be conducted forward under cover of darkness by battalion S-4 to a battalion point of release, where the kitchen trucks will be met by guides from the several companies; and if circumstances permit, food

may be carried in the kitchen truck to a point convenient to the individual companies, and the men fed from the kitchen truck. If this is not possible, food will be moved forward by carrying parties using hot food containers for the purpose. The kitchen truck will wait for the return of the hot food containers before going back to the train bivouac. For breakfast, this process is repeated in time to permit the kitchen trucks to withdraw just prior to daylight. Usually, at the same time breakfast is served, troops will be issued a cold lunch for the noon meal. Another method is to have the kitchen trucks move up after dark, carrying not only the hot supper, but also the field range and ingredients for the next two meals. Supper will be served hot, kitchen trucks will individually withdraw to a night location, as close to troops as circumstances will permit, and cook breakfast which will be served hot just in time to permit the kitchens to withdraw prior to daylight. Of course the midday lunch is issued to troops with breakfast. This latter plan has the advantage of reducing the amount of truck movement at night in forward areas and minimizes the chance of trucks and details becoming lost. It has the corresponding disadvantage of risking the loss of the kitchen by enemy action and of forcing kitchen personnel to prepare breakfast and lunch with little or no light. But in either event, commanders should insist that all supply and administrative vehicles, and this includes kitchen trucks, which are not actually needed in forward combat areas, be withdrawn before daylight to concealed train bivouacs in the rear. The guiding principle is that every supply and administrative vehicle not immediately essential to combat must be stripped from forward combat areas during daylight; this is not only for the protection of the vehicles but also to reduce truck density in combat areas and give more freedom of movement to fighting troops.

The kitchen trucks of course need water, and procurement of water is the function of the Division Engineer. The engineer battalion, utilizing its water purification units, pumps, and storage tanks, establishes water points convenient to the kitchen train bivouacs of the division. Since neither the division

engineer battalion nor the quartermaster company is equipped to transport water in large quantities, the regiments must always send their transportation to the water points. Kitchen trucks will usually perform this task, as they usually will have the water containers of their units.

It is also necessary to provide for gasoline and oil for our motor vehicles. This is accomplished by having each vehicle equipped with one or more extra gasoline containers. Each vehicle that goes to the rear for supplies will replenish its gasoline and oil at the most convenient gasoline supply point which will be established by army at locations convenient to all other supply points. Vehicles remaining in forward areas will be resupplied by gasoline brought forward by division or unit transportation. The usual method is by exchange of empty gasoline cans for full ones, although if available, commercial filling stations may be utilized.

Other types of supplies are handled as directed by G-4. In some cases, supplies will be sent on the daily train to the railhead and from there transported to troops by either division or unit transportation. In other cases the division may send to army depots for supplies after having been notified that the supplies are available.

If we remember that basically the motor vehicles of the infantry division are provided to take over the jobs formerly performed by animals, it will be easier to realize that they are designed for use in the supply and evacuation of the division. However, these motor vehicles can, and on many occasions will, be used to move troops to battle, but all factors should be carefully considered before diverting these vehicles from their primary mission. Troops without supplies are of little more value than supplies without troops. We must have both in sufficient quantities at the proper place at the proper time, if we expect to attain success in modern war. That famous statement of General Forrest, "The way to win a battle is to git the mostest thar the fustest" still holds good. Please note, the General did not say "the mostest men." He simply said "the mostest." The intelligent use of our motor vehicles will go a long way toward the accomplishment of this mission.

I will have no timid officers. He who is not bold and of good heart does not deserve to serve in the Prussian army.

—Frederick the Great

Planning an Administrative Rail Movement

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AR 55-130 states: "In order to have complete data available at all times for expeditious rail movements, every transportation officer will maintain on file in his office data showing the rail equipment necessary to transport the entire command as a whole as well as by separate units. He . . . will complete his files by listing the supplies and equipage to accompany the troops under varying conditions." The reason for this is rather obvious; sooner or later all units will move by rail to training or staging areas, and advance planning is necessary if last minute haste, waste, and confusion are to be avoided.

What can be done in the way of advance planning? The first thing any unit transportation officer can do before receiving movement orders is to accomplish a *Railway Facility Reconnaissance* form. This form should be accompanied by maps and sketches, and should show such information as (1) railroads serving the post, camp, or station; (2) location of entraining points; (3) length of sidings; (4) car capacities; (5) ramp facilities for loading vehicles; (6) road net to the sidings and parking space available; (7) lighting facilities; (8) distances from bivouac and motor park areas to entraining points.

In order to determine what additional planning can be done, examine the procedure to be followed in accomplishing a rail movement. As soon as travel orders directing the movement of troops are issued, the commanding officer will direct the unit transportation officer to arrange the necessary transportation. The Traffic Control Division, Office of the Chief of Transportation, Army Service Forces *only* is authorized to place orders with railway agencies for the railway equipment for the movement of units and detachments of more than 40 men. Requests for railroad equipment and routings for such movements will be made to the Traffic Control Division, Office of the Chief of Transportation, Army Service Forces, through *local transportation officers only*. Therefore the unit transportation officer must give the local transportation officer the necessary information for transmission to the Traffic Control Division. This information will include (1) designation of troops (for secret or confidential movements only code reference will be given); (2) number of personnel (officers, enlisted men, etc.); (3) point of entrainment; (4) date and hour troops will be ready to entrain, or date and hour for arrival at destination; (5) destination; (6) amount of railway equipment

desired; (7) whether in mixed trains, or in solid freight and solid passenger trains.

How much of this information can be determined in advance? (1) The particular troops to move certainly will not be known, so any plan should take into consideration all elements of the command separately. (2) The strength of the command or its elements cannot be forecast for any particular date; therefore any plan should be based on table of organization strength. (3) The point of entrainment, (4) date, and (5) destination will have to be obtained from the movement order when it is received. (6) The amount of railway equipment desired cannot be forecast accurately, since it will depend upon the strength, equipment to be taken, and which one of the "varying conditions of the movement" is ordered. But an estimate can be arrived at, based on current tables of organization, tables of basic allowances, and equipment tables. Then upon receipt of the movement order the estimate quickly can be revised based on actual strength in personnel and equipment, and on the conditions of the movement as set forth in the order. (7) The conditions of the movement will determine whether it is in mixed trains or in solid freight and solid passenger trains, but the overall car requirements will be the same for either type of movement.

The accompanying *Rail Movement Table* (Figure 1) is a suggested form of work sheet for listing the "rail equipment necessary to transport the command as a whole as well as by separate units" and the data required by the local transportation officer, which can be determined in advance. There are a number of "varying conditions of movement" such as: combination rail and motor, with or without general purpose vehicles*, organizational equipment crated and loaded in box cars or loaded in unit vehicles, and moving in mixed trains or in solid freight and solid passenger trains. However, tables need be worked out only for two general conditions, i.e., with general purpose vehicles and without general purpose vehicles. From these two tables, sufficient information can be obtained for a hasty revision covering any particular condition of movement.

The *Rail Movement Table* might include only regiments and separate battalions and companies, but

*Vehicles of a standard design, without special equipment and common to more than one arm or service. Example: A 2½-ton cargo truck is a general purpose vehicle as contrasted with a 2½-ton truck, small arms repair, which is a special purpose vehicle for use of Ordnance units.

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when it comes to making up the composition of the trains the requirements of units down to include the company will be needed. Therefore, in the column headed *Unit*, show all type companies or comparable units in the command. For example, for an infantry division this column should show division headquar-

two seats, or if overnight travel is involved, in tourist Pullmans, three to a section. Noncommissioned officers below the third grade are entitled to a separate berth, and will normally be assigned to an upper. Standard Pullman requirements should be shown as so many thirty-seconds (capacity 32) per unit, since

RAIL MOVEMENT TABLE

Col. No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Line No.	T/O	Unit	Strength			Organizational equipment		Checkable baggage		Vehicles and				
			Officers	Warrant officers	Enlisted men	Pieces	Weight	Pieces	Weight	Standard vehicles				
										(Type and shipping length)				
1														
2														
3														

FIGURE 1.

ters, headquarters company, military police platoon, infantry regimental headquarters and headquarters company, infantry service company, infantry anti-tank company, infantry battalion headquarters and headquarters company, infantry heavy weapons company, infantry rifle company, artillery, engineers, etc. From the requirements of these basic units, the requirements of the division as a whole or any combination of these units which go to make up any particular train can be computed very quickly. Under the *Strength* column, initially show the table of organization strength. All unit commanders should be required to submit a report covering the number of pieces and weight of their organizational equipment for *that* column. The number of pieces of baggage is limited to two barracks bags per enlisted man, and a bedding roll, trunk locker, and one piece of hand luggage per officer and warrant officer. The weight must be estimated, but the railroad will transport free, checkable baggage up to 150 pounds per person, and this should be the maximum allowed any individual. Organizational equipment and checkable baggage must be figured separately, since separate railway equipment is used and since the latter is carried free. In the column under *Standard vehicles*, list in the heading those vehicles which will be found in a majority of the units in the command, such as 1/4-ton trucks, 2 1/2-ton trucks, etc., together with their shipping lengths. In the *Special equipment* column, itemize by unit the special type vehicles and equipment not common to many of the units.

In figuring the *Railway car equipments*, list at the top the types of cars which will be used. Officers and warrant officers travel in standard Pullmans, one to a berth. Enlisted men travel in coaches, three to each

the officers and warrant officers of all units traveling on the same train will be grouped in one or more Pullmans. Tourist Pullman requirements for a unit should be figured to the nearest car. Every effort should be made to keep units intact and not mix units in the same car. If necessary to accomplish this, a few men may be double-bunked in upper berths. Kitchen-baggage cars (railway baggage cars used for kitchens only—not for baggage) are normally furnished on the basis of one per each 250 men or fraction thereof. However, the exact number cannot be determined until the *Train Consist Table* has been made up. But a safe preliminary estimate is to allow one for each company. It will be found that the railroads are liberal in furnishing these cars if the demands are reasonable. Box cars are used for carrying checkable baggage, and one-half of a box car will easily accommodate a company's baggage. Box cars also are used for organizational equipment when it is not loaded in unit vehicles.

Flat cars are obtainable in varying lengths, but the majority will be from 40 to 42 feet long. No attempt should be made to use cars all of one length. The governing factor should be the maximum utilization of all car space—use whatever vehicle groupings and car lengths will best accomplish this. The resulting various length car requirements will be, in all probability, in proportion to the number which the railroads will be able to furnish. Scales of one-quarter inch equals one foot offer a convenient method of loading the flat cars on paper. One foot must be left at one end of the flat car for brake wheel clearance. Seven jeeps can be loaded crosswise on a 50-foot car. For the details of the method of loading vehicles and equipment, each unit should have a copy

PLANNING AN ADMINISTRATIVE RAIL MOVEMENT

of the Association of American Railroads' manual entitled: *Rules Governing the Loading of Mechanized and Motorized Army Equipment, Also, Major Caliber Guns for the United States Army and Navy, on Open Top Equipment.*

With two of these tables worked out—one for the

The Traffic Control Division, after contacting the Military Transportation Section (liaison agency of the Association of American Railroads) will inform the local transportation officer of (1) MAIN numbers (Association of American Railroads' number authorizing the movement) which authorize the move-

RAIL MOVEMENT TABLE (Continued):

15	16	17	18	19	20	21	22	23	24	25
equipment per unit		Railway car requirements per unit								Total Pullman and freight cars
Special equipment		Pullman		Freight						
Items	Shipping length	Std	Tour	Ki-Bag.	Box	Flat cars				
		16 Sec 32 men	12 Sec 1 DR 39 men			40'	42'	45'	50'	

FIGURE 1 (Continued)

units moving without their standard purpose vehicles and the other with their standard purpose vehicles—the unit transportation officer will have completed his advance work. Upon receipt of a movement order he can quickly make a revised *Rail Movement Table* based on his preliminary work and corrected to agree with the instruction in the order and the actual strength of the units in personnel, vehicles, and equipment. The information from this revised table and the order itself should provide the local transportation officer with the necessary data for transmission to the Traffic Control Division.

ment of all trains, (2) what equipment will be furnished, (3) schedule of train departures, and (4) the average number of cars for all trains in the movement and the maximum number for any one train. If the equipment to be furnished differs from that requested, the unit transportation officer must revise his *Rail Movement Table* accordingly.

The next step for the unit transportation officer is to make up the *Train Consist Table* (Figure 2). This table is merely a summary of the car requirements from the *Rail Movement Table*, with the units rearranged and grouped by trains. It will list also the

TRAIN CONSIST TABLE

Train No.	Transportation groupings	Railway equipment						Train officers
		Pullman		Kitchen- baggage	Box	Flat	Total	
		Standard	Tourist					
1								CO..... TO..... Mess O..... Surg.....
2								CO..... TO..... Mess O..... Surg.....
3								CO.....

FIGURE 2.

train officers. Trains should be numbered in order of departure. Why cannot this table be accomplished before the arrival of the movement order? Because it is based upon two factors, each of which is dependent upon the movement order. First, it is based upon the commander's instructions on the order of arrival of

INDIVIDUAL TRAIN LOADING PLAN

TRAIN No. MAIN No.

**ASSIGNMENT OF PERSONNEL AND EQUIPMENT
TO INDIVIDUAL RAILWAY CARS**

Front

1	2	3	4	5	6	7
* * * * *						
Rear						
50	51	52	53	54	55	56

**ASSIGNMENT OF UNITS TO CARS
(BY BLOCK NUMBERS ABOVE)**

Unit	Block Nos.	Unit	Block Nos.	Unit	Block Nos.

FIGURE 3.

units at destination, and this can be determined only after the commander knows where he is going, how he is going, and why he is going. And secondly, it will depend upon the railroad's instructions as to the size of trains which can be handled. Trains of moderate size, capable of making good speed, are

ample, a unit moving from Cincinnati to Newport News over the Allegheny Mountains might be limited to fifty-car trains, whereas the same unit moving from Cincinnati to Kansas City, using the same locomotive, might be able to move in eighty-car trains. Assuming the traffic density on both lines is the same, the time movement to Newport News will be sixty per cent longer than to Kansas City, even though the distances are approximately the same. The point is that the length of the trains is dependent upon the route and must be determined by the railroad for each particular destination. If a type train (a standard train of a fixed number of various type cars) is to be used, the consist of the train can be made up in advance. But the size of the type train must be limited to that which can operate over the most difficult terrain under the most unfavorable circumstances. Type trains therefore are not the most expeditious means of transporting a unit. The railroads must determine also the schedule of train departures, since they will be fitted in at a time when they will interfere the least with regularly scheduled trains.

The railroad having advised the total number of cars, by type, which will be furnished, next will want to know how the trains are to be made up. The units will know to what trains they are assigned, but not to what specific cars. And unless the units load their vehicles and equipment exactly as the transportation officer planned, they may have some left over. Therefore an *Individual Train Loading Plan* (Figure 3) must be drawn up for each train. Each plan should be identified by the train number and the MAIN number. The suggested form has a block representing each car, with the blocks numbered consecutively from front to rear. A symbol written in each block would identify each type of car, for example: CH

ENTRAINING TABLE

Train No.	Main No.	Order Depart	Loading			Departure		Arrival		Entraining officer
			Point	Date	Hour	Date	Hour	Date	Hour	

FIGURE 4.

preferable to long trains of slow speed. But there are a number of factors which determine the size of trains, the principal of which is the character of the roadbed over the route to be followed, especially as to grades, curves, and physical conditions. For ex-

would represent a coach; SP, a standard Pullman; TP, a tourist Pullman; KB, kitchen-baggage; BX, a box car; and F-45, a 45-foot flat car. Then by use of other symbols the vehicles and equipment which are to be loaded on any particular flat car would be

shown. For example *F-45 1 1 5* written on block 27 would mean that the 27th car would be a 45-foot flat car with two $\frac{1}{4}$ -ton trucks and one $2\frac{1}{2}$ -ton truck loaded thereon, where 1 represented a $\frac{1}{4}$ -ton truck and 5 represented a $2\frac{1}{2}$ -ton truck. A legend explaining symbols must accompany the table. The assignment of cars to units would be shown in the table beneath the train diagram. Normally, passenger cars will be at the head of the train. These will be followed by the box cars, and the flat cars will be at the rear. The baggage cars used for kitchens will be spaced as required between the passenger cars, so that the men can form mess lines at both ends of the car. If any additional time is desired to install kitchens in baggage cars or to load vehicles and equipment, the railroads should be notified as soon as possible through the local transportation officer so that those arrangements can be made. This will very frequently be necessary when loading docks or ramps are limited.

Based upon information in the *Rail Facilities Reconnaissance* form, the *Train Consist Table*, and the schedule of train departures as furnished by the railroads through the Traffic Control Division, the *Entraining Table* (Figure 4) can be drawn up. This table is a summary of all trains and shows for each train, its MAIN number, order of departure, entraining point, entraining officer, and times of loading, departure, and arrival. The entraining points, if more than one is used, should be assigned with special attention to the location of the unit bivouac and motor areas. One entraining officer may be designated for each entraining point or one may be designated for each train.

Since no two rail movements will be made under the same conditions, the details of planning must conform to the circumstances of each individual case. The method suggested here will form the basis for all troop movement planning, the only adjustments necessary are those to provide for special circumstances.

Guerrilla Warfare

IT HAS often been stated that this is a corporal's war, not because Mussolini and Hitler were corporals, but because the small group is the basic group in modern warfare. Self-contained fighting groups, numerically small but highly trained in guerrilla tactics, are essential.

Guerrilla war, meaning "little war," has assumed such proportions, owing to the number of countries overrun by the Fascists in Europe and Asia, and the number of guerrillas fighting against oppression, that what a guerrilla is, and the meaning of guerrilla warfare, should receive the utmost attention.

Confusion seems to have already crept in and is spreading, such as the confusion of Commando troops, paratroops, or other special *regular army* troops with guerrilla forces. Fundamentally, the guerrilla is a native, a national, operating in his own country, locally where possible, or in other areas in conjunction with local guerrillas behind the lines of an occupying enemy. The guerrilla stays put when the enemy advances, or makes his way back where possible through enemy lines to his local habitat. The Asturian miners in Spain, the Chinese, the Russian partisans are particular examples.

Raids by Commandos, like those on the coasts of Norway, France, and Libya, do not come within the category of guerrilla and should not be confused with such. These raids are carried out by specially trained regular troops, specially selected for these particular tasks, for these particular objectives. They land on enemy territory, carry out their task, cooperate where possible with guerrilla forces and return where possible to their original base, to prepare for future operations elsewhere.

Here are a few DO's for guerrilla fighters—observe, hide, surprise, fight, flee, memorize, ambush, resist, delay, disrupt, damage, disorganize, destroy. Integration and cooperation between groups, and collaboration between field forces and the guerrilla, should lead to a highly balanced effort for the quick destruction of enemy landing parties.

Get fit, and keep fit; then get fitter.

Learn to live in the open. Get tough. It's the toughness that counts. You don't get tough in bed. Learn to climb. Learn to swim with equipment. Learn to crawl on your hands and knees. Learn to run long distances. Carry no maps. Carry no written instructions. Fear not death. *L'audace, l'audace! Toujours l'audace!*—[From an article in the Australian Army Journal *Salt* 21 December 1942.]

How Brave Is the Jap?

[An article by Frederic S. Marquardt.*]

BEFORE December 7, 1941, the average American regarded the Jap as a comical little fellow who bowed deeply from the waist and said, "So sorry." He was a good gardener, as those who lived in California knew, and had just the proper air to make a fine Fifth Avenue butler.

But as a fighting man, the Jap was obviously a joke. His army hadn't been able to lick China in four years, and his navy had launched a warship so badly constructed that it turned over when it hit the water.

This picture was destroyed forever, though, by the bombs which fell on Pearl Harbor. Instead of being a light opera character who excelled in flower arrangement and tea ceremony, the Jap suddenly emerged as a terrible fighter who marched all day on a handful of rice and died with a smile on his face. He was so fanatically patriotic that he promptly disembowled himself if he met the slightest reverse on the field of battle.

The image of the Jap warrior grew to truly terrifying proportions in the Philippines, Malayan and East Indies campaigns. He landed on coral-girt shores and advanced through impenetrable jungles. He used bicycles to rush down the Malay Peninsula, and tanks to smash through Luzon.

Instead of being merely imitative, the Jap blossomed out—in our imaginations at least—as one of the most resourceful, ingenious fighting men of all time. His navy Zero plane could outmaneuver anything we had in the Far East. In the jungles the Jap dressed himself in green, climbed into the trees and did some of the fanciest sniping since Daniel Boone. No military venture was too dangerous, no natural obstacle was too difficult, for this astounding little son of Heaven.

Fortunately, after these first awful months of war, American fighting men began to whittle the Jap down to size in our perspective. Bataan began to destroy the image of the unstoppable Japanese warrior, and the battles of Coral Sea and Midway showed that our side could win victories too. Then the Marines made their spectacular grab for the southeastern Solomons, and commando raids on enemy strongholds in the Pacific showed that the Jap was as susceptible to surprise and force as any other soldier.

There remained, however, the incredible valor of the Jap. He was utterly

fearless in battle and died in heroic fashion.

Lieutenant H. L. Merillat, Marine Corps public relations officer who took part in the first Battle of the Solomons, reported that not one of the hundreds of Japanese on Guadalcanal Island surrendered. They holed up in caves on the cliffs, and the only way to still their fire was to kill them.

On nearby Gavutu Island, the American raiders had to kill every one of 1,200 Japs before resistance ceased. On Tulagi 600 of the enemy were found and 600 were killed.

The Japs who attempted to retake the Tulagi area, in the second phase of the Battle of the Solomons, were as brave as the original garrisons. A Navy communique, releasing the official story of the fighting, told how 92 Japs tried to land on Tulagi, and how all 92 were killed before the Marines could report that the attack had been repulsed. Across the way, at Guadalcanal, 700 Japs landed, and 670 were killed. The remaining 30 were taken prisoners, and the presumption is that they were wounded.

In a hit and run raid on Makin Island, in which Jimmie Roosevelt was second in command, Carlson's Rangers left two of the 330 men in the Jap garrison alive. This pair hid in the tops of the trees, and the Marines couldn't find them.

All of which adds up to some pretty spectacular mass dying by the Japs.

But what makes the Jap so brave? Briefly, the Japs have two words for it. The first is *Shinto*, and the second *bushido*.

Let's take *bushido* first. A liberal translation of the word is "military-knightways," which freely paraphrased means "precepts of knighthood." So far so good. But when you try to find out what those precepts are, you are in for trouble. About all you can learn is that they are no more like the knightly precepts of King Arthur than *sukiyaki* is like a porter-house steak.

Once I got hold of Dr. Inazo Nitobe's slim volume entitled, *Bushido—the Soul of Japan*. *Bushido*, he said, consists of a few maxims, handed down from generation to generation. It is a code, most frequently unwritten and unuttered. Exactly what goes into the code, neither Nitobe nor anyone else I have come across has been able to say.

But if we don't know what *bushido* is, we do know what it does. It makes the

Jap tough. The ancient Samurais taught their children *bushido* by sending them to public decapitations, then making them visit the charnel house at night and leave a mark on the trunkless head of the person who had been executed.

Japanese babies apparently get *bushido* along with their mother's milk. Otherwise, how can you explain the fact that Jap kids never cry in public? If a Japanese child is human enough to cry out when he is hurt, according to Nitobe, his mother rebukes him saying, What a coward to cry for a trifling pain! What will you do when your arm is cut off in battle? Or when you are called upon to commit *hara-kiri*?

Of course, Japanese scholars insist there is more to *bushido* than a stoical indifference to pain and hunger and discomfort. But undoubtedly that indifference is its greatest contribution to the courage of the Jap.

Shinto is something else. If *bushido* is the soul of Japan, *Shinto* is the way of life of the Japanese. It is the basic fact that makes the Jap different from everyone else, for at heart every Jap is a *Shintoist*, and in reality no foreigner can become a *Shintoist*.

Shinto is not a religion. The Japanese government won't permit it to be called a religion, because that would put it on a par with Christianity and Buddhism in Japan. *Shinto* teaches of no heaven or hell and makes no distinction between good and evil, except insofar as things are good or bad for the state. The chief of *Shinto* is the Emperor of Japan, the direct blood representative of the first divine Goddess herself.

Through some obscure processes of *Shinto*, even the lowliest Japanese subject partakes in the divinity of the Emperor. Every Jap, from cabinet minister down to garbage collector, knows he is of a superior race, chosen to rule the world. This fanatical *knowledge*, something far different from the average American's belief that the United States is the best country in the world, is responsible for much of the Jap's determination to prove his superiority.

Even on the athletic field, the Jap who loses feels that he has been remiss in his duty to *Shinto*. Never have I seen such handdog looks as those on the faces of Jap athletes forced to stand in the second or third position on the Victory Stand. One Jap Davis Cup player actually jumped off the liner carrying him back

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HOW BRAVE IS THE JAP?

from the matches in Paris, because he had been defeated.

Perhaps you have stood, as I have, on Kudan Hill in Tokyo, before the great Shinto shrine erected to honor Nippon's warrior dead. The name of every Jap who had died in battle, from general to private, is supposedly written on the sacred rolls in this temple.

I have watched Japanese widows tell wide-eyed youngsters that their father's spirit lives in the shrine. And I have seen the children nod understandingly as their mothers tell them that they can attain no greater honor than to have their names inscribed there. Small wonder they die so willingly when their Emperor calls.

But in assessing the courage of the Jap, it is well to remember that Americans, without either bushido or Shinto to urge them on, are equally willing to die for their country. In the battle of Midway every one of the 15 planes in Torpedo Squadron 8 was shot down as it drove home an attack on an enemy aircraft carrier, and only Ensign G. H. Gay, Jr., lived to report that a hit had been scored. Major Lofton R. Henderson, of the U. S. Marines, showed that suicide attacks were no exclusive attribute of the Jap, when he crashed his plane into the deck of a carrier.

The comparative bravery of Japanese

and American troops was best assessed on blood-soaked Bataan, where months of daily battle provided ample occasion to prove who was the better man. I have been privileged to read the letters of several American army officers who were on Bataan and who managed to get mail out by plane and submarine before the fall.

"The Jap is stubborn," wrote one American army officer. "In the three days of mopping up on the Bagac side of the lines, we had to kill over 300 Japs who had seeped through our lines or gotten ashore from boats. We offered them surrender, but they threw grenades and fired while they had ammunition and then resisted with the bayonet.

"We got 20 alive who had been stunned, and they state if they had known we did not castrate our prisoners and otherwise torture them, they would have surrendered. They state that the officers would kill any man who returned—that they themselves would not be able to explain why they had been taken alive—and that they would be shot on sight in order that the officers might maintain the fiction.

"I have not seen them do this, but men who were at Pilar say they saw Jap officers shoot down Jap soldiers who were breaking under our counter-attack, and they insist it was deliberate. Others state they saw Japs, whom they took to be

officers, beat and cut down with swords men who were faltering in our machine-gun patterns."

Another letter from Bataan says:

"The Jap is a good fighter, there is no doubt about that, but that he is a man eager to die has been exploded by the number of times we have driven him back in his headlong rushes against our lines. I have seen him step over the carcasses of his dead comrades to come on, but that means nothing as there was nothing else to step on. And I have seen our own Filipino boys drag dead comrades to fill a ditch so that they could get across.

Schooled in a medieval code of ethics, believing implicitly in the sacredness of his race's mission on earth, the Jap is a formidable foe. But the American is just as willing to die for his home and country as the Jap is for his Emperor and ancestors.

And the American has one great advantage over the Jap. The American is an individualist and has been taught to *think*. The Jap is only a cog in a great machine and has been taught to *obey*. The American will die when he thinks it will do some good. The Jap will die whether it advances his cause or not.

And in the long run, the brave man who uses his head should beat the brave man who can only take orders.

An army which preserves its usual formations under the heaviest fire, which is never shaken by imaginary fears, and in the face of real danger disputes the ground inch by inch, which, proud in the feeling of its victories, never loses its sense of obedience, its respect for and confidence in its leaders, even under the depressing effects of defeat; an army with all its physical powers, inured to privations and fatigue by exercise, like the muscles of an athlete; an army which looks upon all its toils as the means of victory, not as a curse which hovers over its standards, and which is always reminded of its duties and virtues by the short catechism of one idea, namely, the honor of its arms:—such an army is imbued with the true military spirit.

—Carl von Clausewitz.

Notes for Instructors

[Extracts from a pamphlet by J. H. Panton, M.A., first published in Great Britain and later in Canada for the use of the armed forces.]

Lord Gort as Chief of the Imperial General Staff said of the booklet from which this article was taken: "I wish this pamphlet to be read by all instructors. In view of the recent expansion of the Army, there are many officers who have had little experience of teaching. To them, this pamphlet will be of special value."—THE EDITOR.

A RECRUIT, on first joining a unit, has much to learn which may contrast strikingly with his ordinary civil life. He will learn a great deal of what is required indirectly without any special instruction. Consciously and unconsciously, by imitation of those around him, he will pick up many of the traditions, customs and ideals of the service which he has entered. The habit of cheerful unhesitating obedience to authority is an example of one of the many things that are best learnt in this way by actually participating in the life of an organization where this is the rule.

One of the most important functions of an instructor is to help the recruit by suggestion and example to fit into his new rule of life. He should always remember his responsibility for indirect instruction of this kind and, at all times and in all circumstances, he should endeavor to incorporate in himself and in his attitudes the very best traditions of the service.

Important as indirect learning is in the development of a recruit into an efficient soldier, a large part of the time available must necessarily be spent in direct instructions in the various details of the soldier's work. Among other things he must be trained to be confident and expert in the use of his weapons, and to co-operate with his fellows in drill movements essential to enable him to take his proper place in a controlled and flexible unit. All these aspects of a soldier's life will need careful teaching, and the most valuable ally that an instructor can have in this work is the recruit's own "will to learn."

Instruction is most effective when the will to learn is present, and this comes when the recruit is interested in the work in hand. It should therefore be the object of the instructor to seek out methods whereby he can stimulate and maintain the interest of the recruits. Among the many ways of doing this are such aids as variations in the work, avoidance of over-fatigue, grading of work to suit the stage reached by the recruit, and the exhibition of an enthusiastic interest in the work in hand by the instructor himself. Enthusiasm is infectious, and an enthusiastic instructor will obtain a better response from his class than one who may be equally competent in his subject, but who lacks the power to communicate his enthusiasm.

Competition is very useful in maintaining interest. Individual competition should not be overdone lest it unduly depress the slower members of the squad. Collective competition is more valuable in obtaining the co-operation and interest of individual members, and in leading to a healthy pride in their unit.

Above all, the instructor should endeavor to understand the recruits' point of view and to follow the workings of their minds. It is advisable to avoid sarcasm, which sets up an undesirable and hostile relationship. It is better if his attitude is one of sympathy and understanding. Sympathy in this sense does not involve "softness," but rather the ability to develop in the recruits an attitude of confidence in their

instructor, whom they should come to respect as a first rate soldier, anxious and able to help them to learn their job. The instructor can help to develop this attitude by his personality, perseverance, tact and understanding, and by his insistence at all times on the very best work of which the recruits are capable. At no time should he accept any slipshod work, and his ability to distinguish between "ravenousness" and carelessness is an important factor in his success as an instructor.

Interest and the will to learn are helped by success on the part of the learner. Continual failure depresses and the learner tends to lose heart. Instructors, therefore, should commend good work, not only on the part of the quicker recruits, but also when some improvement is shown by the slower learners. Whilst he should not hesitate to point out the extent by which any effort fails to reach the required standard of efficiency, the instructor should reserve serious reproach for those efforts which are accompanied by slackness or carelessness. The justice of this is realized by all concerned and the co-operation of the recruits is more readily secured.

When a learner wishes to acquire a particular skill, he usually watches another performer. He then attempts to imitate him. If his attempts meet with some success, he feels a certain amount of satisfaction and repeats the actions until he can perform the operation with ease and increasing skill. Further practice seems to knit the connections in the nervous system so as to form a pattern which is all the more ready to go on repeating itself. Repeated failure, however, gives no satisfaction to the learner and he may eventually give the whole thing up as a bad job.

It is only half true to say that "practice makes perfect." Progress depends mainly on the nature of the practice, which should ideally be the imitation of a perfect model by an interested person who is practicing correct movements only. The nearer the instructor can bring his squad to this ideal, the more successful his teaching will be.

The importance of proper practice cannot be over-emphasized. The recruit learns much more by doing than by listening. The required co-ordinations of his nerves and muscles can only be brought about by actual exercise. Instructors should therefore rely more on practical work and the recruits' responses than on verbal exposition. They are advised, therefore, to cut their explanations to a minimum consistent with effectiveness.

Instructors are warned that progress in learning acts of skill is not necessarily a steady and continuous business. There are often arrests or even setbacks in development. For example, when the separate components of a complicated movement or chain of movements are practiced so as to knit them together, learners sometimes show startling and disappointing awkwardness even in those parts which have apparently been thoroughly mastered previously. This calls for constant watchfulness and correction on the part of the instructor, and it is at this stage that encouragement and assistance are more important than ever. Some stages are never passed by certain individuals through disappointment and discouragement at times like these.

Over-fatigue, especially of the finer muscles of the hand and eye, is also a fruitful source of arrested or faulty development. When this occurs, control becomes erratic and continued practice is likely to bring wrong movements into play.

Over-practice combined with over-fatigue will often lead individual members of a squad to form by exercise faulty habits of control. A change of occupation or period of rest is recommended whenever signs of this appear.

No hard and fast rules can be given regarding the length of effective practice periods at any one particular skill. It depends on the physical state of the men, on their interest and on the nature of the skill. Sympathetic watchfulness on the part of the instructor is essential.

It must also be remembered that individual recruits will vary in their rates of progress. Some will be naturally quick in their development of skills. They seem to be endowed with readily adaptable machinery for learning new movements and co-ordinating nerves and muscles. Others are naturally clumsy or slow in development. It is the instructor's task to get from every man the utmost efficiency of which he is indi-

vidually capable. Provided, therefore, that the awkward members of the squad are making their maximum efforts, they should meet with encouragement and never with reproach, which will only tend to make them clumsier than ever.

Successful instruction is mainly a result of mastery over one's own job, knowledge of the effective methods of teaching, understanding of the workings of the recruits' minds and of their abilities and limitations, and, perhaps, what is most important of all, enthusiasm for the work. The more an instructor is able to communicate this enthusiasm, the better. It is the individual recruit who is the ultimate teaching unit and who must be stimulated to make the required efforts on his own behalf which will lead him to become an efficient soldier. The instructor, by his example, skill and knowledge and care, can guide the learner's efforts in the right direction most effectively when the will to learn is present.

Gliding

[An article in *The Fighting Forces* (Great Britain) December 1942.]

"THE ARMY PUPILS are a grand lot of chaps—all keen, and they learn quickly." This was the verdict of an experienced R.A.F. instructor at a glider training station in the South as he surveyed a bunch of khaki-clad, crash-helmeted figures making their way to the "tow-path," as the flying field is called.

They were members of the Army's airborne force who had volunteered for the adventurous task of piloting Britain's fast-growing glider fleet into battle. They have all undergone rigorous Army training before taking up a job which requires the skill of a pilot when in the air and fighting physique when they have landed their gliders on enemy soil.

This job has particular appeal for the Army men who at one time had aspirations towards the R.A.F. Now they are being taught by the R.A.F. in the handling of this new weapon which has helped to revolutionize modern warfare. Soon these Army corporals will be sergeants, wearing the wings of the Airborne Division.

Only the worst weather is allowed to interfere with training. Tugs with gliders attached are constantly taking off and landing separately—the gliders being released in the air—while tractors scud about to pull the grounded gliders to the edge of the airfield ready for the next trip.

In the early stages of glider training the pupil does not

wander far from the aerodrome. He concentrates on circuits and landings. When he gains more confidence and has learned something about navigation, he goes on cross-country runs and may land at a strange aerodrome.

He must develop the ability to make a good landing at any time, because there can be no "second chance" with a landing glider, in contrast to the powered aircraft. Once the landing maneuver has begun it must be carried through, whatever the consequences or misjudgment, for there can be no switching on of engines to avoid an overshoot.

At first the pupil flies the glider light, with an instructor. As he becomes used to handling the craft he flies solo, with ballast. A landmark in his career is when he takes his first "live" load. This is regarded as something of an ordeal, but, as one pupil put it, "We all have confidence in each other and take turns to be passengers."

Coinciding with glider training are lessons in map reading and navigation. The pupil must attain proficiency in these or he is "ploughed."

After some months the novice pilot gets his wings. There are no restrictions in rank as to who may volunteer. Quite a number of senior officers have learned, side by side, with men from the ranks, ready for the day when they will lead Britain's formidable new air arm into action.

The War On Interior Lines

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a German article written by Major Otto Lehmann for *Militär-Wochenblatt* 9 October 1942.]

AT THE end of August 1939, Germany reaped all the advantages from the initial situation offered us by our position on the interior lines of the European area. The way in which Germany managed matters at that time has constituted the nucleus of the events which have occurred up to the present, taken as a whole. There is no doubt that Germany, alone at first, later with Italy, still later with all of Europe, and finally with Europe combined with Japan and Eastern Asia, had the intelligence to work out the common battle against England and the United States of America, as well as with Soviet Russia since 1941, on interior lines so far as command is concerned.

The employment of the natural advantages which the conception of interior lines offers is dependent on certain fundamental prerequisites: great planning and bold decisiveness on the part of the supreme command, men fighting a life and death struggle on these interior lines, an organization of transportation lines within the limits of the European area worked out and carried out down to the finest detail, a common system of war economics functioning without friction on an autocratic basis, and finally, armed forces of all the various types and combinations which, as a result of unified organization of the nation or nations from the standpoint of education and military training, are able, both from the points of view of terrain and climate, to take care victoriously of any enemies which may show up.

An old proverb says that generally speaking even the best of coalitions are of no use in time of war. The nations which are joined in the three-power pact have disproved this saying in the war up to the present time. The cooperation is excellent for the reason that all the nations sharing in it have the same goal and a proper conception of this battle for life and death.

The end of August 1939 saw Germany faced with the necessity of calling Poland to order. The political reasons are sufficiently well known. A review of the course of events from the military point of view, being irrelevant, will not be attempted in this article.

We will only say here that the reacquisition of the Saar and Rhineland was looked on as a matter of course, one to be expected by Germany, and this furnished the basis for the construction of the West Wall, but that the great German Command, in view of the world situation which was rapidly approaching a crisis, was obliged to revise still other boundaries on the basis of the right of nations to self-determination, in order not to be threatened or hampered on the southern flank with the advent of the expected war. Especially Czecho-Slovakia represented a serious threat to central Germany.

When the war in Poland began, the European theater of operations was cleared up, the southern flank secured, and the north flank in no danger for the time being. This first appeared during the first winter of the war. The nonaggression pact with the Soviet Union disturbed England's plan for a second-front war and made of the Polish adversary what she, now fully isolated, always had been: a stubborn member of the European community of nations.

The course of the operations in Poland showed the correctness of this. Working outwardly from the interior, Germany turned with the largest part of her armed force, together with the organizations from Slovakia, in a lightning-like thrust to the east, occupied the West Wall at the same time with forces

strong enough for defense purposes, and threw out security toward Belgium and Holland although they were neutral. The advantages of these initial operations, working outwardly toward two sides from the interior, were based on the disposition of the German traffic routes laid out in an east-west direction. That England and France made no attack on us (for this would have been the only possible way for them to help the Poles), had its particular reasons and these have a basis which is psychological more than anything else. The short sea front was in a condition similar to that of 1914, except that the German naval forces were considerably weaker than at that time. This was compensated for to some extent by a considerable German superiority in the air. When in mid-September 1939 the first transports rolled out of Poland toward the West Wall, Germany's fight on interior lines was clearly revealed.

By their inactivity during the first three weeks of September, France and England had lost the foundations for their war against the nucleus of Europe—Germany. The idea of fighting on interior lines is that the one so fighting, by means of hard, fast blows, tries to gain advantages for himself both from the standpoint of time and space. He accomplishes this by the formation of strong points served by a system of communication routes laid out in accordance with his own plans. These strong points can be reached by materially shorter routes, hence more quickly, than is possible for one operating over greater radii on the outside of the circle and who is always forced to operate over materially longer routes requiring more time. The fight on interior lines brings success and victory to the one who makes best use of the dissimilar values of space and time. The drive against Germany by France and England on the west and by Poland on the east had failed. But England by no means intended to be frightened away from another drive. In London and Paris the Maginot Line was looked upon as the sure guarantee of the intended crushing of the strategic German northern flank by way of Norway and Denmark, later with the help of Sweden and Finland as allies. The Finnish-Soviet conflict, therefore, interested the western powers very greatly. Help might, perhaps, be had in the north without any difficulties.

Things turned out quite differently, however.

The problem of space and time became a regular academic example of a decisive, lightning-fast decision on the part of those fighting on the interior lines although the areas held by the two parties, England and Germany, hardly showed any essential difference except that the way from England to Norway was over the sea exclusively while the German command was able to operate over land and sea routes in their move to secure the northern European flank—over sea routes which varied between a short leap across the Baltic and the long dangerous voyage with open left flank clear to Narvik. Ten hours were decisive in the matter of the fate of the northern European flank in favor of the German Reich which was located on the interior lines. Ten hours increased the theater of operations in the heart of Europe, which up to that time had been quite limited, gave the flank toward the sea in the triangle of water a wholly different aspect, and consequently, opened to this new area prospects for an air war against England which could hardly be disregarded at that time.

The surrender of France completed the development. When, late in the summer of 1940, we had the whole western Euro-

pean coast firmly in our hands from the Pyrenees to the North Cape, the European Atlantic coast, the western flank of all of Europe, was secured. However, the area of indirect and direct warfare on interior lines had again materially increased beyond this limit. Italy lengthened it to the south and projected out like a wedge into the Mediterranean toward Africa. The advantages of the interior lines were responsible for the fact that it was possible to carry on operations effectively both by sea and in the air on the western front; they were clearly materialized geographically by the fact that the two Axis powers were able to do what they pleased without the enemy's being in a position to prevent it over the common traffic routes between the North Cape, Sicily, and North Africa, or between the North Cape and Bordeaux. It was on this basis that the Italian-German battle for supremacy in the Mediterranean developed quite automatically and the battle of the Atlantic continued further with increased energy.

The strong points had shifted greatly in a few weeks' time.

England had failed to pierce the northern European flank in April, and she now attempted to strike at the southern European flank with the help of the power she still possessed in the Mediterranean and the Orient. But Italy, acting from the vantage point of the enlarged European theater of operations, took a hand in the development by striking at Greece. In the spring of 1941 Germany had quietly completed an initial assembly against Greece and had concluded matters successfully and thoroughly with Bulgaria and Rumania. In Northern Africa German-Italian formations were fighting against England who was attempting to clean up that area from the east to the west clear to the Atlantic coast. Those were critical days and weeks which, however, by making use of the advantages which the interior lines offered to the Axis powers in increased measure, were successfully weathered. A network of transportation routes organized in the very best manner permitted movements of forces southward in a minimum of time while England, located on the exterior line, was forced to transport her materials and forces in a manner requiring a great deal of time. Most of this was by water routes and some of it by land, the last short stretch extending through territory that was scarcely civilized and was without good transportation facilities. Furthermore, the British transportation difficulties were greatly intensified by sea and air attacks also conducted on interior lines. The rapid construction of aviation strong points for the Mediterranean front and toward England constitutes one of the most instructive chapters in this war of the Axis powers on the interior European lines.

With the Balkan campaign and the victories in northern Africa, the southern European flank was on the way to security in 1941, but the hard struggle for supremacy in the Mediterranean still had to be gone through. If England were shut off from the Mediterranean, the European war and economic area would extend *de facto* from the North Cape to northern Africa and would give the best prospects of success and the greatest latitude to any operations against the British Empire in the southeast.

By the summer of 1941 the land operations had created the best outlook for the sea war against England, a war comprised in the concept of the "Battle of the Atlantic," since land operations working outwardly from the interior had gained possession of the coasts, and working outwardly from these England's life lines by sea could be attacked. What had not been gained in the World War, namely favorable bases for the sea war against England, had been acquired in this one, thanks to the extremely successful operations on land on interior lines. Germany secured this strong position by a sea-wall in the west. Nothing more was to be feared here. A Soviet-Jugo-Slav agreement at the beginning of the Balkan campaign which was incapable of altering the situation in the least as regarded the fate of Jugo-Slavia and the Balkans, caused the world to prick up its ears. As a result of the English war policies the strong point of the war had been transferred to eastern Europe in the meantime. By doing this, England was able to unite her own interests in the Near East with a new drive by Bolshevism against the whole of Europe. The Bolshevik colossus was supposed to be able to perform the task of overrunning Germany by land and finally conquering her, and with her, Europe.

The development which led to the war against Bolshevism had not taken the German command by surprise, but had even found it ready in advance. Germany had sovereign control, from the standpoints of economics, war, and transportation, over the European area and had completed on the quiet—again on interior lines—the initial assembly toward the east which was the greatest that had been accomplished up to that time. On 22 June 1941 Germany herself made a surprise attack on the enemy.

In the great fight against Bolshevism the advantages of the interior lines, with regard to the European powers who were now forced to face the most pernicious enemies of humanity, were spread over a battle front by land extending from the Arctic Ocean to the Black Sea area and as far as Africa by land and sea combined. Under these conditions, free rear and free flanks, there occurred in eastern Europe in a few months' time a campaign of annihilation against the Soviet Union such as had never been known before. With freedom both in decision and in movement, Germany had driven England out of the European area, gained valuable areas in all directions, and made Europe safe against blockades. This extension of the conquered area made the highest demands on the conqueror especially in regard to construction and maintenance of the entire railway network of Europe and with regard to matters pertaining to the problems of food and armament.

The fight on interior lines had flourished to this extent when, on 7 December 1941, Japan went into the world-wide fight against England and the United States from her place in Eastern Asia. The war so far had been confined to Europe, but it now becomes a world war in the truest sense of the word. In this second main portion of the struggle, the conception of the interior lines plays a still more decisive role than in the first.

War is waged with less and less sentiment. Perpetual peace is only a dream; it is not even a beautiful dream.

—Marshal von Moltke.



MILITARY NOTES AROUND THE WORLD



GERMANY

New Heavy Tank.



150-mm gun, with its protective shield, mounted on a Mark II tank chassis.

(*Deutsche Allgemeine Zeitung*)

New German Antitank Gun:

Probably the most powerful antitank gun yet developed is the new German 75-mm P.A.K. 41 which made its appearance for the first time in Tunisia. It is built on the Goerlich tapered-bore principle: that is, the muzzle of the long-barreled gun is smaller than the breech. It fires an armor-piercing projectile which weighs 5.7 pounds and is almost 30 inches long. With the tremendous initial velocity of 1,000 feet a second, it can probably penetrate about 5½ inches of armor at 500 yards and over 2½ inches of armor at 2,500 yards (almost a mile and a half). It has a much shorter range than the 88-mm but it weighs much less—on wheels, only 1.4 tons—and has a very low silhouette.

(*New York Times*)

Notes on Military Equipment:

Artillery.—German artillery, although insufficient in quantity in Tunisia, outranged all our field pieces except the 155-mm gun. The backbone of their artillery was the three-purpose 88-mm weapon, extremely useful in antiaircraft, antitank, or field artillery roles.

Tanks.—The Mark VI Tiger tank is a new German heavyweight which had many battle tests in Tunisia. It weighs about 60 tons, mounts an 88-mm gun and two heavy machine guns, has a crew of five, and makes a speed of about 18 to 20 miles an hour. Front face plates and turret armor are very thick, but side armor is much lighter, and this tank has been knocked out by the American "bazooka" or rocket gun, by the 37-mm

fired at point blank range against the side, and by larger guns.

An improvement in the German Mark VI tank, known as the Panther, with more armor on the sides, somewhat more power, and detachable face plates that can be bolted on when the tank goes into action is reputedly being developed, but so far as is known it has not been in action.

Mines.—The Germans have developed land mines and booby traps to a fine, hideous art. The German "teller" mine, which is discus-shaped, four inches thick, and a foot in diameter, and contains about eleven pounds of explosive that is set off at 300 pounds pressure, was the best antitank mine used in Tunisia. One of the most devilish anti-personnel mines consisted of a canister filled with an explosive charge and packed with about 250 shrapnel balls. Buried in the earth with three small prongs protruding, it bounded into the air when the prongs were trod upon and exploded about waist high.

(*New York Times*)

Military Strength:

In spite of losses the German army still maintains a strength of about 300 divisions, of which 28 (minus three destroyed in Tunisia) are armored. Many of the 300 are second line or garrison divisions. There has been a reduction of strength in many of the German divisions, some of them now having only two instead of the customary three infantry regiments, and in some of the regiments there are only two battalions.

It is estimated that Germany should be able to raise more than a million men this year, about half of them from the new 17-year-old class (born in 1926) and the rest from a comb-out of industry. Thus the German army should be able to maintain its present strength of about 300 divisions, but any increase in strength seems unlikely.

The Axis satellite powers of Europe are still able to contribute heavily in military manpower. They can put about 150 divisions, in addition to Germany's 300, into the field. Italy is maintaining about 75 divisions; Rumania has perhaps 19 mobilized; Hungary provides 15; Bulgaria, 16; Finland, perhaps 16; Croatia, 8; Slovakia, 2.

The German air force is in a much worse condition than the army in relation to the growing strength of its opponents. Its combat strength has probably not been seriously reduced in actual number of first-class planes, but its weakness lies in its reserve strength. Among all the German fighting forces the best morale seems to be in the air force with the submarine sailors next, but a decline in the quality of the airmen has been noted by some observers.

(*New York Times*)

Antiaircraft Towers:

According to German radio reports new antiaircraft towers have been erected for the defense of Berlin. Of great size, each of these towers is said to contain as much ferro-concrete as about 10 miles of the Westwall fortifications.

Apart from housing gun crews of some 200 men, shelter for civilians is available within these towers. According to the Germans the structures are bomb proof and are equipped with twin guns of a new caliber using new types of ammunition especially developed for defense against both high and low flying aircraft.

(*Chicago Tribune-Associated Press*)

GREAT BRITAIN

The British Eighth Army:

Last October at El Alamein the British Eighth Army consisted of seven infantry and three armored divisions, but during the long pursuit of the Afrika Korps across the desert no more than two or three divisions are known to have been engaged at the same time in any one action with the Axis rearguard.

Four infantry divisions took part in the Mareth battle. Each had a distinct task and was independent in the performance of its particular duties, although every move was a part of a coordinated plan. The Fiftieth Division is a north-country English division which arrived in the Middle East two years

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ago and for the last year it has taken part in every notable action in North Africa. During the retreat to El Alamein the Fiftieth was surrounded by Axis troops on several occasions but each time it fought its way through the enemy, and in the battle for the Mareth Line its Northumbrians were selected to deliver the frontal attack which occupied a great part of the Axis strength and contributed much to the ultimate victory. The majority of the men of the Fifty-First Division, raised in the Scottish Highlands, were under fire for the first time at El Alamein. It is composed of battalions of The Black Watch, The Gordons, Seaforth Highlanders, Cameron Highlanders, and the Argyll and Sutherland Highlanders. The Second New Zealand Division has fought in the Mediterranean theater and in Africa for the last two years and its men have often been selected for important detached missions. The Fourth Indian Division has fought in every campaign in Africa since the battle of Sidi Barrani when it opened the way for the first Libyan offensive. Of its nine battalions, three are from the British Isles and six from India.

(Britain, May 1943)

CHINA

Heavy Infantry Weapons:

According to the *Pictorial Orient*, of July 1941, mortars form the principal armaments of the Chinese Army. There are 58- and 120-mm mortars, each consisting of barrel, bipod, and base plate. They are apparently manufactured in China. In addition, England has furnished China with Bren machine guns.

(*Militär-Wochenblatt*)

JAPAN

Mountain Cannon:

The Japanese 75-mm mountain cannon, F, has a barrel with a length of 4 feet 8.68 inches (L/19.2). Its elevation range is from minus 8 to plus 25 degrees and its angle of pindle traverse is 7 degrees. A maximum range of 5,610 yards is attained with a muzzle velocity of 1,138 feet per second and a projectile weighing 15 pounds. In firing position the gun weighs 1,496 pounds according to *Schweitzer Artillerist*.

Japan also has at her disposal a somewhat lighter mountain cannon, the 75-mm Meiji, which with a projectile of less weight, 12.10 pounds, and a greater muzzle velocity of 1,332 feet per second, attains the greater range of 6,820 yards. Its elevation range is from minus 10 to plus 35 degrees. Since the gun tube has a length of 14.5 calibers (3.53 feet) the gun weighs but 1,110 pounds in firing position.

(*Artilleristische Rundschau*)

Machine Guns with Artillery:

The Japanese artillery is heavily armed with machine guns for close defense. The light artillery regiment of an ordinary division, according to *Ejercito*, March 1942, has 138 machine guns for its force of 2,700 men, and the light artillery regiment of a light division with 2,600 men has 72 machine guns. Hence, there is one machine gun for each 20 or 36 men, respectively.

(*Artilleristische Rundschau*)

Artillery:

150-mm Field Howitzer: Besides the 105-mm field howitzer with which the 4th

battalions of the divisional artillery regiments are equipped, and which have a range of 13,200 yards, the Japanese army also has 150-mm field howitzers in addition to the 150-mm field howitzers Model 1915 and the 150-mm Model 1936 field howitzers, both of which represent the older 1905 model with a few changes. Also it possesses a newer model, the M 1929 field howitzer L/14.7. Its barrel has a length of 10.8 feet. Its field of fire covers 43 degrees. According to *Revista di Artiglieria e Genio*, a maximum range of 11,000 yards is attained with a projectile weighing 79.2 pounds and a maximum muzzle velocity of 1,386 feet per second.

(*Artilleristische Rundschau*)

Accompanying Artillery:

The gun companies of Japanese infantry regiments possess four mountain guns, namely, 75-mm mountain cannon, type F. According to Passov's "Pocket Hand Book of Armies" these are constructed after the pattern of the Krupp M. 08's. Their carriage is provided with a gun shield and small wheels. The gun is drawn by a horse or by its crew of six men.

(*Militär-Wochenblatt*)

Tanks:

Tanks with Cannon.—Japan has at her disposal highly effective tanks among other things in her modern war equipment. Two types of medium and two types of small tanks mount cannon.

As a medium tank the Japanese employed, to begin with, the 11.1-ton Vickers M.K.C. tank which came from England and which is armed with one 57-mm cannon and four machine guns and is heavily armored. Next they developed from this the highly efficient 14-ton tank which is equipped with one cannon and two machine guns and which, according to *Deutsche Wehr* was used as far back as the Chinese war of 1932 and is now again being used in the war against China.

The Japanese also used in the Chinese war a 7- or 8-ton tank, the Etsu, developed from the French Renault tank NC 27, which is armed in the revolving turret with two machine guns or with one machine gun and one armor-piercing cannon of small caliber. This tank is no longer manufactured, however, and has been replaced by a small tank with one cannon, developed by the Japanese.

The Japanese also have a 3- to 4-ton tank, the M2592, which, according to Heigl, *The Pocket Tank Book*, 1935, is equipped with one 20-mm cannon in the turret and has a crew of two men. It has again been put to use in the present conflict.

(*Artilleristische Rundschau*)

SWITZERLAND

Army Training:

The Swiss Army bicycle patrol undergoes strenuous training, riding over difficult mountain terrain and crossing Alpine passes partly covered with snow and ice. It is dangerous.

The Swiss Army command stresses a toughening routine that includes leaping through underbrush and over various obstacles into gravel pits and stony riverbeds, and swimming across rivers with full packs. Swiss soldiers, expert marksmen and skiers all, are also drilled regularly in the art of setting mines, in camouflage, flame throwing, and other devices of modern war.

A carefully conceived system keeps men on duty for a given number of months. After this period they return to civilian life for a time, with their jobs always held open for them. They are replaced at the front by other men who in turn must assume the duties of watching and training. In this manner, throughout the war emergency, Swiss citizens are enabled to retain their efficiency both in army and in civilian life.

(*New York Herald Tribune*)

U. S. S. R.

Russian Artillery:

122-mm cannon.—The 122-mm cannon, M 31, according to *Coast Artillery Journal*, has a barrel with a length of 46.3 calibers, or L/46.3 which equals 18.53 feet. Its elevation range is from minus 4 to plus 45 degrees; its traverse range, 56 degrees. Its projectiles weigh 55 pounds, and with a maximum muzzle velocity of 2,640 feet per second, attain a range of 23,100 yards. In firing position, the cannon weighs 15,620 pounds; ready for transportation, 16,940 pounds.

152-mm cannon-howitzer.—The 152-mm howitzer M 37 has a split trail with gun shield and pneumatic wheels. The barrel, whose length is 14.49 feet, (1/29) and which, according to *Militär-Wochenblatt* No. 3, 1942, is provided with a muzzle brake, is drawn back, when towed by power, for the purpose of obtaining a better distribution of the load. In order to lessen the great weight forward, heavy equilibrators are used. The projectile weighs 99 pounds; according to other sources, 88 pounds. A maximum range of 18,700 yards is attained with a maximum muzzle velocity of 2,211 feet per second. For transportation, the gun is attached to its limber and towed by means of a caterpillar tractor with a maximum speed of 12½ miles per hour. The cannon-howitzer has a weight, when ready for fire, of more than 15,400 pounds, and when ready for transportation of more than 17,600 pounds.

203-mm howitzer.—The Russian 203-mm howitzer, L/22 M 31, was developed from the Skoda howitzer. Its barrel, with a length of 14.66 feet, has a two-stage screw breech-block with plastic obturator. Its box trail is provided with broad track treads instead of wheels. Its elevation varies between 0 and plus 60, while the traverse (plus or minus 4 degrees), according to *Deutsche Wehr* No. 31, 1942, is effected by movements of the trail over a rail and by means of the aiming mechanism. The projectile weighs 209 pounds (according to other sources, 215.6 pounds). The maximum range is variously reported to be 13,750 yards and 14,080 yards with the maximum muzzle velocity of 1,765 feet per second. In firing position, the howitzer is said to weigh 33,000 pounds, other sources giving the weight as 34,751 pounds.

The gun is usually moved in two loads, each of them towed by a large tractor with caterpillar tread, which also carries the crew. The six-wheel carriage which carries the barrel weighs 16,676 pounds while the gun mount weighs 25,753 pounds (according to other reports, 24,200 pounds). The latter has a gauge of 6.56 feet.

(*Artilleristische Rundschau*)

Russian Tanks:

Artillery projectiles.—According to Soviet regulations, the following projectiles are used: explosive shells with percussion and combination fuzes; tank

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shells with base percussion fuze; shrapnel; smoke shells; incendiary shells; projectiles with parachute flares and shells for dropping printed sheets.

Armament of tanks with cannon: In contrast with the past situation Russia now has at her disposal a very large number of tanks which mount cannon of light, medium, and heavy types. She possesses the following:

1. Light tanks:

8.55-ton Vickers-Armstrong T 26 A tank, armed with one 37-mm cannon and two machine guns.

9.55-ton Vickers-Armstrong T 26 B tank, armed with one 45-mm cannon and one machine gun.

9.7-ton Vickers-Armstrong T 26 C tank armed with one long 45-mm cannon and two machine guns.

2. Medium tanks:

10.5- to 12-ton Christie tanks, armed with one 37-mm, 45-mm, or 76.2-mm cannon and one or two machine guns.

28-ton T 28 tank, developed in Russia, armed with one short 76.2-mm cannon located in the gun turret and three or four machine guns.

26.3-ton T 34 tank, developed in Russia along the lines of the Christie BT tank, heavily armored, armed with one 76.2-mm cannon 38/39 L/30.5 in the rotary turret and two machine guns.

3. Heavy tanks:

45-ton T 35 A tank with five turrets armed with one short 76.2-mm cannon in the main turret and one 45-mm cannon in each of the turrets on the right in front and left rear, also with three or four light machine guns and, in case of need, with one anti-aircraft machine gun beside the main turret.

45-ton T 35 B tank with four turrets. Only a few of them are in existence.

45-ton T 35 C tank, the newest type, armed with one 76.2-mm cannon and two light machine guns in the heavily armored main turret, as well as with one 45-mm cannon and one light machine gun in the small turret ahead of the main one.

43.5-ton tank, armed with one 76.2-mm cannon in the rotary turret and two machine guns forward.

52-ton tank, armed with one 152-mm cannon in the revolving turret which weighs 12 tons, and two light machine guns forward.

According to *Panzertruppe* there were a few other types not in very great numbers, among them a giant tank weighing over 100 tons which mounted, in its two-story structure, three cannon, one of 105 millimeters caliber, as well as four machine guns. This tank was limited to solid highways or roads only, and had a speed of only 15 kilometers (about 9.5 miles) per hour.

(*Artilleristische Rundschau*)

Soviet Weapons:

The hand fire-arms—rifles and carbines of Models 1891/1930—are equipped with telescopic sights. The following cartridges exist for the 7.62-mm caliber weapons: pointed bullets; bullets with steel core, both tracer and non-tracer types; and explosive bullets. The cartridges are in clips of five each.

The Simonov automatic cannon, Model 36, is a gas-pressure operated gun with bored barrel, straight-pull breech block, and insertion magazine for ten to fifteen cartridges. The magazine may be inserted already filled or it may be loaded into the weapon with clips. The automatic weapon weighs 11 pounds. It can be used

for single shots or for continuous fire and is provided with a muzzle brake.

The Tokarev Model 38 automatic rifle with stock in two pieces, and the Model 40 with stock in one piece, are also operated by gas pressure but are provided with swinging breech-blocks. In the magazine there are ten cartridges. A muzzle brake, a leaf sight, and a telescopic sight which may be attached characterize the 8.8-pound automatic rifle.

There are two types of machine pistols (tommy guns) Models PPD 38 and 40, which differ mostly in their rate of fire. These weapons are recoil loaders. The cartridges are fed by means of a drum with 71 cartridges. In Model 38 a rate of fire of 600 per minute is attained while in Model 40 as many as 900 shots per minute are attained. The Tokarev pistol, M 33 PT is of the same caliber as the machine pistols, 7.62 millimeters, and therefore uses the same ammunition.

The light machine guns which are seen most frequently are the Degtyarev model and the Maxim-Tokarev model. The former is a gas-pressure operated gun with a stationary barrel. It weighs 18.5 pounds and has a drum magazine for 60 cartridges and a bipod, while the Maxim-Tokarev model is a recoil-operated gun with a moving barrel, belt load, and a weight of 28.6 pounds. There are also a number of other models.

The heavy model 1910 Maxim machine gun which operates on the same principle as the German 08 and 08/15 machine guns, is used with the Sokolov wheeled mount. There also exists a supplementary tripod wheeled mount for AA defense. This weapon is replaced by the Degtyarev heavy machine gun, a gas-pressure operated gun with a stationary barrel and a high rate of fire. When mounted on the tripod with a gun shield, the weapon weighs 55 pounds.

The extra-heavy Model 38 Degtyarev machine gun is a gas-pressure operated gun with an air-cooled barrel, a muzzle brake, and a caliber of 12.7 millimeters. The mount permits the gun to be set at various angles of elevation. By means of a belt made up of metallic sections, a rate of fire of 550 rounds per minute is attained. It can be used against ground targets at a distance of 2.2 miles, aerial targets up to about one mile, and armored vehicles up to about 300 yards.

For purposes of antitank defense, the Soviet infantry recently has had placed at its disposal a 14.5-mm antitank rifle weighing 35.2 pounds, a single shot weapon with a muzzle brake.

The Russians are well equipped with mortars. The model 30 Diakonov rifle grenade thrower with cup discharger is disappearing and is being replaced by the 52-mm company mortar. The most important facts can be found in the following table:

Model	Weight in firing position	Range
37-mm spade-thrower type mortar	5.28 lbs.	650 yards.
50-mm trench mortar Model 41	39.6 lbs.	900 yards.
50-mm trench mortar Model 40	48.4 lbs.	900 yards.
52-mm trench mortar Model 37	30.8 lbs.	750 yards.
82-mm trench mortar Model 36/37	132.0 lbs.	3400 yards.
107-mm mountain trench mortar	374.0 lbs.	5500 yards.
120-mm trench mortar Model 38	563.2 lbs.	6600 yards.

The small caliber mortars are directly under the control of the companies, the medium caliber mortars under the battalions, and the heavy caliber mortars are controlled directly by the regiments.

Among the infantry weapons are 37-mm, 45-mm, and 57-mm antitank cannon, all with split trails, as well as the 76.2-mm infantry cannon-howitzer Model 27 with box trail. All these weapons are built for power towing.

Model	Weight in firing position	Range
37-mm AT cannon, Model 30	726 lbs.	7650 yards.
45-mm AT cannon, Model 36	990 lbs.	9850 yards.
57-mm AT cannon, Model 41	2475 lbs.	8760 yards.
76.2-mm infantry cannon-howitzer, Model 27	1716 lbs.	9400 yards.

The 57-mm antitank cannon, Model 41, fires projectiles weighing 6.82 pounds from a barrel 62 calibers in length and is provided with a muzzle brake. It has a muzzle velocity of 1,095 yards per second. Due to the split trail, a traverse range of 56 degrees is obtained.

For towing heavy infantry weapons, use is made of a low-built armored caterpillar tractor with a built-in machine gun.

In the case of the artillery several periods of development are plainly evident. The older equipment coming from Krupp, Schneider Vickers, Putilov, etc., with model designation before 1910, was modernized about the year 1930, the range was increased, and the mount made suitable for power towing. It would, however, take too much space to mention all these guns.

After 1930 entirely new models were introduced copied closely after the products of Bofors, Skoda, etc. These are:

Model	Weight in firing position	Range
76.2-mm field cannon, Model 36	3,520 lbs.	14,950 yards.
76.2-mm field cannon, Model 39	3,300 lbs.	14,550 yards.
76.2-mm field cannon, Model 41	2,420 lbs.	14,225 yards.
122-mm heavy field-howitzer Model 38	4,840 lbs.	13,050 yards.
122-mm cannon Model 31/37	15,620 lbs.	22,950 yards.
152-mm cannon-howitzer, Model 37	16,940 lbs.	18,500 yards.
152-mm cannon, Model 31	26,400 lbs.	28,425 yards.
152-mm heavy field-howitzer, Model 38	9,020 lbs.	13,566 yards.
203-mm howitzer, Model 31	34,760 lbs.	13,125 yards.
240-mm Skoda cannon, Model 40	96,800 lbs.	32,800 yards.
305-mm Skoda howitzer, Model 40	96,800 lbs.	18,025 yards.

The guns possess all the characteristics of modern construction. Hence, according to the employment anticipated, they are provided with split-trail mounts, mounts with caterpillar tread or outriggers, etc. The Soviets regard the 122-mm heavy field howitzer, Model 38, as a very effective gun. It is a split-trail model with a maximum elevation of 63 degrees, and total traverse range of 50 degrees.

The artillery is largely motorized. Agricultural tractors and track vehicles are employed on a large scale. We also find such auxiliaries of artillery as captive balloons, radio, etc. In addition, there are mobile railway guns and former naval guns in fixed positions.

For anti-aircraft defense, three- and four-barreled machine guns of 7.62-mm caliber, and machine guns of 13.2-mm caliber are employed. There are also 20- and 37-mm Model 39 machine cannon, as well as Model 31 76.2-mm and Model 39 85-mm anti-aircraft cannon. Searchlights necessary for defense and fire directors are also found.

The armored arm seldom uses the older models any longer, for instance the Model T 27 Bronieford small tank,

MILITARY NOTES AROUND THE WORLD

the Models T 37 and T 38 amphibian tanks, the T 26 A two-turret light tank, or the T 28 and T 35 medium types. The ones mostly in use now are:

Model	Wt. in tons	Armament
BA Ford Armored scouting car.....	5	45-mm cannon; 2 machine guns.
Light armored tanks T 26 B and T 26 C.....	10	45-mm cannon or flame thrower; one machine gun.
Light armored type BT tank.....	13	45-mm or 76.2-mm cannon; 1 machine gun.
Amphibian tank, type T 40.....	5.5	13.2-mm machine gun; 1 machine gun.
Light T 60 tank.....	8	20-mm machine gun; 1 machine gun.
Medium tank, type T 34.....	26	76.2-mm cannon; 2 machine guns.
Heavy tank, type KW 1.....	44	76.2-mm cannon; 2 or 3 machine guns.
Heavy tank, type KW II.....	52	152-mm howitzer; 1 or 2 machine guns.

The light tank, type T 60, much used as a scouting car, has armor up to 20 millimeters in thickness and is equipped with an 85 horsepower motor which gives a maximum speed of 27.3 miles per hour.

A point worthy of note is the great employment of tank platoons which are of the most varied composition.

Among motor vehicles, in addition to the track type of vehicles already mentioned four- and six-wheeled 1- and 2½-ton trucks with Ford motors have been developed into standard types and are very widely employed. In addition to this combat equipment we find a large assortment of other equipment in use, especially mines, flame-throwers, hand grenades, etc., which are often used with Asiatic cunning and craftiness.

There are armored planes which attack ground targets with cannon and bombs. But there are also antiquated training planes or even gliders from which the pilot is able to drop his solitary bomb only with the greatest of effort.

The great need of the Soviets for suitable weapons is shown by the fact that both England and America are supplying them with arms. We have discovered American machine pistols, heavy machine guns, and 76.2-mm cannon (rebored 75-mm cannon, Model 97), as well as light (General Stuart) and medium tanks. The English have been sending them infantry tanks of types Mark II and Mark III.

The weapons taken over from the former subject border states of Estonia, Latvia and Lithuania have not attained any importance.

(Deutsche Wehr)

Antitank Gun:

The Russian AT cannon, Model 32 or 37, is a close copy of the German 37-mm AT cannon. However, the Russian cannon has a caliber of 45-mm. A range of 7,630 yards is attained with a projectile weighing 0.9 kilograms (about 1.98 lbs.). The firing rate is 30 shots a minute. The gun weighs 946 pounds in firing position.

(Artilleristische Rundschau)

UNITED STATES

Civilian Technical Observation with the Forces:

Wherever a battlefield exists today, a civilian expert from an American company is likely to be in the vicinity. The presence of such men is a new development in wars, one made necessary by the vast amount of mechanical equipment

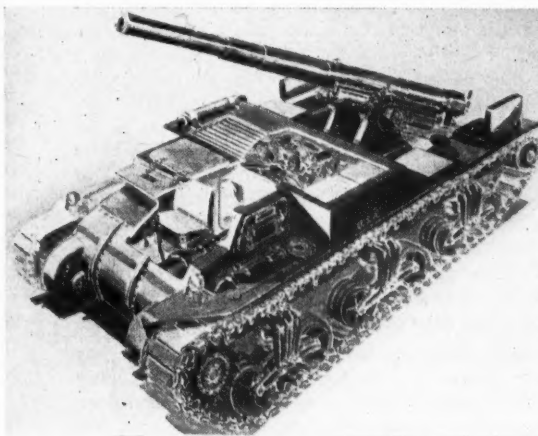
It is estimated that there are some 500 men working abroad in this manner. Stationed at camps within the United States are at least another thousand. The man selected for the job preferably is of age to stand the rigors of climate and war-zone travel. He should have foreign experience—know languages and customs and be an old hand at getting around. He is inoculated with the same serums used by the Army and wears a uniform like that of a war correspondent with an arm band labeled "T. O." for Technical Observer. He may be anything from a factory foreman to a chief engineer. Once abroad, such men are on their own—they can do and go as they please, but they are under the same censorship restrictions as soldiers in the field.

(From an article in *Business Week*)

The M-12:

The Army has developed a self-propelled gun capable of destroying a tank at a distance of ten miles. This is the new M-12 gun, motor carriage, a 155-mm gun mounted on an M-3 tank chassis.

Having the speed of a medium tank, the M-12 can be shifted from one task to



in use. These civilians teach maintenance men how to repair a job. They photograph the work being done to show the home office how hard it may be to reach a certain part needing repair. They write long and thorough reports to their companies about the performance of the equipment in the field.

another by a field commander, giving him higher power potential than he could get otherwise.

The gun throws a 95-pound projectile more than ten miles and could knock out a tank or even sink a destroyer at that range.

(The Kansas City Star)

FOREIGN MILITARY DIGESTS

Digests of articles from foreign military periodicals. Other items of interest from foreign publications are indicated in the Subject Index.

A Day at a German Command Post In Tunisia

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from an article by Gert Habedanck, German war reporter, in *Die Wehrmacht* 23 December 1942.]

WITH MY orders to go to Africa in my pocket, chance took me to a little Sicilian air port. Tunis was named as my destination. I was rather bewildered when I heard this for so far I had heard nothing of our quick move to counter the landing of the English and Americans in French North Africa. An hour later I sat on a high stack of chests and boxes in the spacious belly of a Junkers plane. I had leisure for a quiet study of the map. The supply route is short. The stretch of some 95 miles from Sicily to Tunisia is unsafe on account of English submarines and is within range of English planes from Malta and American planes from Algiers. But over this short stretch, supplies can be effectively protected both by sea and by air. The enemy will have to stand extremely heavy losses if he attacks our transport planes and fighters.

In a broad curve the plane swung over the city and harbor of Tunis. There were only three medium sized steamers lying at anchor. A few miles to the east we circled and landed on the little flying field. It was crowded with German planes. We could see signs of the battle even before landing—four bomb craters on the edge of the field. As soon as we had landed the labor gangs began unloading our plane.

Here on the Tunis flying field the transports kept arriving at short intervals. Our forces were as yet small, but one after the other, officers were reporting to the commander, announcing the type and strength of their units. The colonel addressed curt, earnest words to the assembled officers. "After enormous preparation and with the employment of very strong forces the English and Americans have now established a second front in North Africa. Important bases for the German counterblow are the ports of Tunis and Bizerte. The situation is unusual. As yet there is no combat contact with the enemy on the ground. At any moment, however, an attack may occur from the air, from the sea, or by land. . . ."

While his talk was in progress, the air alarm siren of Tunis was heard. The first bombs fell. The electric current went off. Strong forces were attacking. The ground around the staff headquarters was soon covered with fragments of broken window panes.

At four o'clock a mixed battalion left for the Tunis railway station to be transported by rail to Bizerte. As soon as it was light the windows were filled with curious faces; animatedly gesticulating Italians, Arabs who called "Heil Hitler!," French with serious faces, Jews with all the signs of terror. Tidy streets, pretentious Jules Ferry Avenue with its four traffic lanes, simple stores, and elegant and modern business establishments. The loading proceeded gayly, then the

locomotive gave a tug and the cozy little colonial train went swaying down the track. With wide eyes a few hundred German soldiers watched the peaceful Tunisian landscape pass by—Arabs at their plows, the tents of nomadic natives, a camel at a well, neat European farmers, extensive vineyards, cattle pens with impenetrable cactus fences, orange and olive groves. Then a broad, shallow lake appeared close to the railway line, the Garaet Achkel. In the background was to be seen the Djebel Achkel, a spur of the Atlas mountains, 1650 feet in height and containing a great deal of marble.

It was difficult, on this trip, not to forget completely the seriousness of our task. Traveling in the train was comfortable. The cars were old, to be sure, but comfortable and clean. The temperature was by no means African in character, but like that of Germany on a summer day. We were all wearing our field blouses and a few of us wore tropical helmets.

The train stopped at the port. A few hours before, the first German transport had arrived. Rattling and creaking, the cranes unload one motor vehicle after the other, setting them down on the docks. Every motor truck that was lifted out of the ship's hold was greeted joyously. In spite of a hundred thousand difficulties of all kinds, a complete troop had now been created. And with every day our number would grow as well as our strength and knowledge of the terrain. The troops of the Tunis bridgehead were German guards, and in all command posts old Knight's Crosses were to be seen.

Pursuit planes reported strong columns approaching from the west. Tanks, AT cannon, and rifle troops with packs had been seen. The alarm was sounded in all the units! Then the report came in that the Messerschmidts had strafed the American columns heavily. Some ten burning trucks, confusion, and halting of the column had been plainly observed. Now came great swarms of Junkers planes, whole strings of transports under the protection of fighter planes. More formations kept arriving. . . .

AT THE COMMAND POST OF DIVISION "B" IN A LARGE TUNISIAN FARMHOUSE 14 NOVEMBER 1942.

0:00 Midnight. The commander makes notations on the map, having just received a report. He dictates an announcement to the corps concerning the units that have come in during the last twenty-four hours.

0:27 The light is extinguished. The staff retires for the night. Only the pacing of the guard is to be heard. The officer of the day places the telephone beside his bunk. Both officers and men sleep with their clothes on.

1:17 Bombing attack by the enemy on the nearby flying field. Bright moonlight outside. The sea, outlines of the palms and cactus hedges clearly discernable. Disagreeably cold. Apparently, a light frost. As soon as the whistle of descending bombs is heard all spring behind a thick garden wall.

2:03 A bomb strikes very close. Two window panes are broken by the air pressure.

FOREIGN MILITARY DIGESTS

2:12 Two wounded men from the AA battery arrive. They are bandaged in the anteroom and given shelter for the time being.

2:13 Sentry reports. The heavy AA cannon in the harbor area and bomb explosions can be heard.

3:07 The telephone rings. It is from the corps. The order is given to send out reconnaissance forces toward El B. Mission; observation of enemy movements and establishment of contact with French forces. The head officer of the division is awakened and immediately dictates an order.

3:34 Motorcycle rider with order for the 3rd company of the reconnaissance battalion for a reconnaissance job.

5:56 Motorcycle rider returns with the report that two reconnaissance detachments are being engaged.

7:03 The commander is up. Breakfast of bread, lard, and substitute coffee. Bright sunshine but cool. Djebel Achkel can be seen in the distance.

8:16 The commander leaves in the car for combat group under B. which has been in contact with the enemy since the day before.

9:11 Pursuit squadron reports by telephone: reconnaissance detachment just back from first mission; long column of the enemy approaching; principally busses and trucks with infantry; apparently, also, a few armored scouting cars and guns. The commander of the pursuit squadron has immediately sent out all machines possible and will make low altitude attacks with bombs and weapons of the planes.

9:27 The commander gives orders for the transport battalion: immediate alert and departure. Hold all motor vehicles and use for transportation. Additional units are being sent along and are being placed under the orders of Major W.

10:08 French captain appears and asks that a certain time be set for an interview between his general and the German commander. After inquiry by telephone, 15:30 o'clock is set as the time.

10:17 Orders to the tank company and battery of light field howitzers for immediate departure and a report to Major W. by motorcycle rider. Will probably still reach column.

10:21 Command by messenger to the heavy AA battery under Fl. for change of position so that the highway will be in their field of fire, for the sudden appearance of an enemy column is expected. The failure of telephone lines becomes noticeable. All units placed on the alert by means of messengers. In two hours enemy scouting cars may be in front of the door. Make preparations for close defense. Officers and men of the staff take over the combat sector about the farm. Thick garden wall a very favorable thing.

12:01 Combat group under W. has left. Will they still be able to reach M? It is an important key position for railroad and highway.

13:01 Sudden low plane attack on the flying field. Light AA artillery gives all it has. One pursuit plane is on fire.

13:17 Squadron leader of the pursuit group at the combat post. Two of his pursuit planes go after low-flying enemy planes.

13:57 Noon meal consisting of soup, dates, tangerines. Weather suddenly gets bad. Rain; wind.

14:02 Both pursuit planes again appear over the flying field. The tipping of their wings (signaling) is plainly visible. Report by telephone that a master sergeant, the wearer of a Knight's Cross, has shot down two planes; the other only one, as yet. This makes half the American bombers destroyed.

14:17 Inquiry by messenger made of the 3rd company of the reconnaissance battalion whether any reports have come in yet regarding the reconnaissance at El B.

15:17 Messenger has returned. Scouting detachment has not come back as yet. The company suspects bad roads in the mountains.

15:28 A general arrives at the flying field.

16:03 The commander returns from his trip to the front. Has ordered change of position for combat group under B. The enemy is being reinforced with artillery. There is active ground reconnaissance.

16:07 The commodore of the pursuit group at the combat post. He himself has made low-flying attacks on the enemy. A scouting car set on fire by projectiles, column hard hit, at least eight trucks set on fire, infantry on both sides of the highway decimated, advance halted. Immediate danger removed.

16:27 An Arab appears at the command post. Explains that he is a German noncommissioned officer and pursuit pilot. Was shot down and made his way to the combat group under B. after a 72-hour trip on foot in Arab's clothing, traveling mostly by night.

17:18 Report from reconnaissance company. Apparently the scouting detachment sent out this morning has been wiped out. Native Arabs have reported four dead Germans on the highway. Have brought in their weapons and papers. Also report two abandoned English motor vehicles. The company has immediately sent out another scouting detachment. It is to look over the combat area.

18:03 A report comes in from the Italian commander that there is probably a secret radio transmitter on a farm situated not very far away. Civilians have reported the transportation there of storage batteries and electrical equipment the day before. A lieutenant and five men sent with orders to search the house.

18:29 Telephone call by aviation commander: according to a report by a distant-patrol plane, a convoy of eight merchant vessels, three cruisers, and five destroyers observed heading east about 35 miles north of the coast.

18:48 General back from his parley with the French. Results satisfactory. Sectors designated for French and German troops.

19:01 A French liaison officer arrives—a captain of the artillery; speaks some German.

19:46 Evening meal: bread with sausage, Tunisian red wine (a bit sour), dates and tangerines.

19:52 The first prisoners: a captain, a first lieutenant, and twelve men, caught yesterday in a surprise attack by combat group under B. They are immediately questioned.

20:17 Lieutenant H. back from the search of the farm house. Results, apparently an idle tail.

21:00 Evening report to the corps is given directly by the commanding officer by radio.

22:44 Examination of the prisoners finished.

22:57 The first report from the combat group under W. M. has been reached without contact with the enemy. Streets and entrances to the city immediately secured by the use of tanks. According to reports from Arabs, there are only small enemy scouting detachments in the vicinity. The combat group is to start out again at 6:00 in the morning.

23:10 An Italian first lieutenant arrives; he is commander of a transport regiment assigned to the division. About a battalion and the regimental staff are ready for action. Are immediately assigned to the combat group under W. They are to be loaded into motor trucks the following day and sent forward.

23:17 The reconnaissance squadron reports the return of the second scouting detachment. Dead buried. Our own and English weapons brought back.

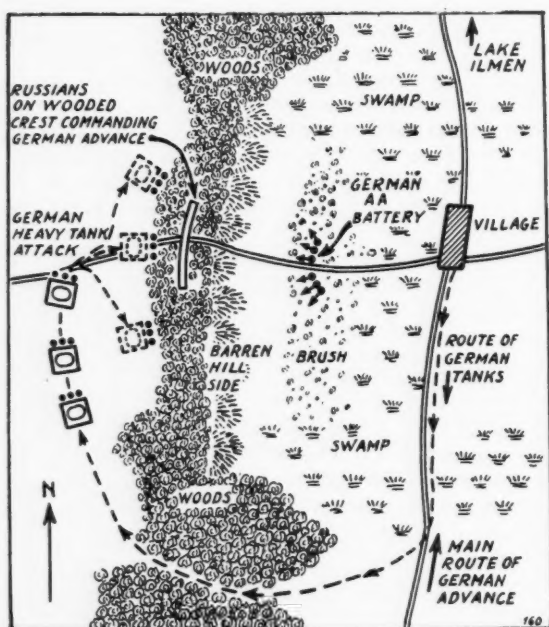
24:00 Midnight again. A clear, star-lit sky, bright moonlight; so far, no visits by the enemy. Outside, perfect peace. A magnificent view across Bizerte bay and as far as Djebel Achkel.

An Encirclement by Antiaircraft Guns and Tanks

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a German article in *Deutsche Wehr* 25 September and 2 October 1942.]

FOR TEN WHOLE DAYS we lay in the assembly area. Then one day towards evening came the order, "Get ready to change position!" In the early morning hours of the following day the division started a new and powerful attack northward in the direction of Lake Ilmen. Our antiaircraft battery was to support the tank attack. Again and again our weapons took turns with the tanks in hammering at the retreating enemy. We simply swept the Russians off the highway and they withdrew right and left into the country on either side.

After about an hour's time orders came from divisional headquarters for a change of position to protect an important highway intersection and hold the village that was built at the crossroad. The reconnaissance officer immediately set out to investigate the new position which was about a mile and a quarter away. At the entrance to the village he learned that the Soviets had let the tanks forming the point of our column pass through, but were now launching counterthrusts from the west, seriously threatening the highway intersection that was to be held by our battery.



Late in the afternoon the battery had worked its way to a position west and southwest of the village where it would be able to get at the enemy properly when he launched attacks against the highway intersection.

Not all the battery had yet reached the position when a first sergeant and four men were sent on reconnaissance into the surrounding brush. This stretch of brushy terrain was some 150 yards in width and was separated from the main highway by a swampy strip some 200 yards across. To the west of the brushy area there arose abruptly a barren hillside crowned with woods. The mission of the first sergeant was to find out whether the woods on the summit of the hill were occupied by the enemy. He had hardly been gone ten minutes when one of his men came rushing back to the battery command post and reported that the wooded strip was full of Bolsheviks, some of whom were mounted. He said that the sergeant and the rest of the men had not

yet been seen by the enemy and were observing from behind cover. The battery commander immediately sent his reconnaissance officer to the tank company with which he was ordered to cooperate. Soon afterward the latter came back with the information that the company with its tanks would go around the strip of woods and take the highway west of it, coming in behind the enemy and driving them into our weapons. Some of the cannon immediately changed position and placed themselves in a slight curve whose open side faced the outlying arms of the woods. About twenty minutes later we were all pleased to see fifteen German tanks of heavy and super-heavy construction rolling over the highway in our rear to carry out their mission. We were all ready and looking forward in pleasurable anticipation of the moment when the enemy would break out of the woods. Out of pure joy over what would happen the first sergeant and his party were almost forgotten. We had already begun to hear the roar and clatter of the tank cannon and machine guns coming through the woods from the south when we suddenly remembered the sergeant who, true to his command, was sticking to his post. As quickly as we were able we sent out a messenger who called the sergeant back.

Our weapons were all ready for action. Our guns, which had proven themselves in many a ground and air battle, stared toward the uncertain strip of woods out of which the enemy might break at any moment. The gun-pointers sat in their seats while the gun loaders loaded the cannon and stood beside them with another round. Behind them stood the gun commander, and between the guns the platoon commander and the battery commander waited tensely for the moment when the Russians would attempt to flee from the attacking tanks, never suspecting that they were running directly into the fire of the weapons of the antiaircraft gunners. The moments that remained before the enemy broke out of the woods were employed in hurriedly digging a few holes for shelter. Carbines and machine guns of German, French, and Soviet origin were placed between the cannon. It was not necessary for anyone to give an order to the soldiers. They had learned in their many fights what such a position should look like in order to give the proper reception to a numerically superior adversary breaking into it. Everybody was digging and laboring feverishly while the commanders stood behind their guns tensely, their field glasses to their eyes. Then suddenly from the left we heard the cry, "They are coming," and immediately we saw the first of the Cossacks running directly toward the center of our position from the road leading out of the woods.

At the command "Fire" from the battery commander, hell broke loose. Relentlessly the guns hammered the Soviets as they broke out of the woods in increasing numbers. Wounded horses reared up with a terrible cry and collapsed on the ground with jerking legs. More Bolsheviks rushed between them. The drivers of horse-drawn vehicles attempted to escape the fire, but the only avenue of escape led over our position because there was swampy ground to the left and right and our comrades of the tanks had them from the rear. Our guns kept hammering into them. Blood spurted out; men, animals, vehicles rushed through the area and every single one of our men contributed his share in annihilating the enemy. Any man who was not needed at the cannon lay behind his machine gun or seized a carbine. Now there was only one answer to the problem: either you, or I! For the first time the phrase used by the Führer after the Polish campaign "The Lord God destroyed them, man, horse and wagon!" was understood in its full meaning. Truly enough, the enemy was annihilated in this place. Every one of the soldiers who was in the woods was annihilated in an exemplary manner through cooperation of tank troops and antiaircraft artillery.

The guns kept up their pounding of the mortally stricken enemy. The Soviets still kept breaking out of the woods and

in the concentrated fire of the six light and medium antiaircraft cannon the attack came to a stand-still. All this had taken place in the space of a few minutes.

Then a short distance from the exit of the woods a white light signal rose repeatedly. We knew that our tanks were coming. The commander had difficulty in stopping the fire of his gunners for they now knew nothing but blood and destruction.

The fire was silenced. Heat waves shimmered above the hot barrels. At the edge of the woods we could see plainly how some of the men and animals lying there in heaps were still jerking. Then the tanks came rolling out of the woods and drove the last remnant of an annihilated Soviet unit ahead of them as prisoners.

The prisoners approached. They were searched for arms. The tank men climbed out of their tanks and looked at the blood bath that had been given by the gunners. Proudly the men of the antiaircraft artillery exchanged with the men of the tank arm their experiences of the last half hour as with pistol or carbine they administered the *coup de grace* to the enemy who had not yet succumbed to their wounds. Under the guard of a few men of the antiaircraft artillery and the tank arm, the gray mass of prisoners—there might have been some 300 of them—went into captivity.

The men in the black blouses smoked a cigarette with the men of the grey-blue blouses. Then came, for the tank men again, the command to mount their vehicles and the tanks rolled along over the highway toward the north.

Developing Successful Attack By Fighting at Night

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from an article in *Krasnaya Zvezda* 31 December 1942.]

IN THE OFFENSIVE fighting which our troops are at present carrying on in the middle Don, south of Stalingrad, and on other fronts, skilful night operations are playing a great role. It is well known that in any attack its continuity and rapid tempo are of primary importance. Quickness and the maintenance of pressure, especially in pursuit, guarantee real success. An hour gained is sometimes better than a threefold superiority in strength. When a breakthrough has been successfully made in the whole depth of a hostile defensive system and the enemy is retiring, a single regiment operating boldly can cut off the retreat routes of a whole hostile division. To let the chance slip on such occasions means not only to miss success but also to give the enemy the possibility of recovering his strength, consolidating, and organizing more effective resistance.

Now, when the days are short, night operations are extremely important. Taking advantage of the night, it is possible to advance still farther forward and seize new positions. But that is not all. It is important to create such conditions of attack as to prevent the enemy from retiring under the cover of darkness, from completing maneuvers and regroupings, and from setting up new defensive lines.

Thus night operations constitute one of the prerequisites of the continuity and rapid tempo of the attack, especially in the winter. Therefore, those commanders who engage the enemy in night combat are acting absolutely correctly. But this is not done everywhere. Smaller and larger units are encountered which break off their activities at the approach of darkness or at most limit them merely to reconnaissance. It even happens that reconnaissance also practically ceases at night. Such facts result from nothing else than obvious lack of appreciation of night fighting and the habit of considering the night only as a time of rest.

It has already been proved by dozens of battles that it is possible and essential to carry on offensive fighting at night not only by infantry, but also by other types of troops. Of course in night fighting the infantry plays the chief role but it must operate with all elements of reinforcements, with artillery support, and sometimes with tanks and aircraft.

Naturally, for the success of night operations, the commanders must know which tactics to use at various stages of the battle. It is necessary also to shift skilfully from the methods of daytime to those of night combat. The best thing to do is to attack from the position of immediate contact with the enemy. In these circumstances the enemy usually covers the whole area in front of his positions with registered fire. His weapons are prepared before nightfall for the execution of night fire. With the approach of darkness the enemy increases observation primarily in the sectors whence night attack seems most probable. Therefore, under such conditions the attack must be characterized by particularly methodical organization. The units are assigned limited missions—for example, the seizure of only a definite position or line. Of course, as in all night attack, stress must be laid on the secrecy of operations and the suddenness of attack. Lacking surprise, night operations frequently lose their significance and may even complicate the battle. The exact plan of combat is worked out with the view of obtaining the element of surprise based on some very simple maneuver.

In planning the attack the commander indicates in detail the objectives and directions of the action, establishes the positions of departure, and accurately plots the paths of movement along orienting points observable in the dark. With the same thoroughness those lines, areas, and points are designated on which the artillery and mortars are to fire. In short, all details down to and including the illumination of the locality are punctiliously considered, and the combat as a whole is scrupulously prepared before nightfall. Only under these conditions is it possible to expect success.

When the forward edge of defense has been successfully broken through and operations are developing in its rear, it will also be necessary to continue fighting at night for the sake of uninterrupted attack. Every success gained in daytime must be extended at night. Night operations inside the enemy defensive zone have their own peculiarities. Here it is necessary to consider everything without stopping to reorganize, and to make readjustments occasionally in extremely limited periods of time. If, let us say, the day is nearly done while the battle is still raging, the commander must bear in mind that it will soon be dark, the groves, heights, and fields will be plunged into obscurity, and everything will take on a different appearance. The possibilities of observation and the methods of operation will be different. Whatever may have been the intensity of the battle before dusk fell, the commander must already have planned what he is going to undertake at night and how the attack is to develop.

Reconnaissance and security are necessarily intensified. The combat formations shift to decreased distances and intervals. All this must become a habit for the units, as also, for example, the immediate organization of captured positions for defense. But aside from this, there must be a well conceived plan for the development of the battle at night. In every concrete instance special measures are necessary. When fighting for any strong point in the defensive rear, the commander can probably commit his reserves, getting them ready for the operations while the main forces are attacking. The attacking units may also receive additional instructions concerning the direction and even the objective of the attack. Everything must be pointed toward taking advantage of the decisive movement and, if possible, advancing on the heels of the enemy to his next positions and seizing them. Advantage must be taken of every gap in the combat formations of the enemy even at night for further advance and for the encirclement and destruction of strong points.

The Germans use the night to withdraw their troops from under attack. Sometimes they conceal the retirement under a flurry of mortar fire and counterattacks. We must not be fooled! When the situation dictates it, it is necessary to pursue the enemy with all our combat formations even at night. If in the conditions of the attack on the forward edge it is better to avoid complicated maneuver, in the period of pursuit everything is decided by boldness of maneuver. Night is likewise propitious in that it permits advancing where by day this would be associated with excessive risk. At night not only ski troops and motorized infantry, but also tanks can outdistance the retreating columns of the enemy and seize important points on the hostile communication routes. Parallel pursuit, encirclement of the enemy, isolating him from his bases, demoralization of the rear—all this must be attempted, making use of the night for concealment of maneuver and surprise attack.

The operations of small groups and detachments consisting of ski troopers and automatic riflemen must be particularly developed during the period of pursuit. By penetrating at night into the abutments and intervals between the retreating units of the enemy and by occupying advantageous positions on the flanks and rear, they often create decisive conditions for the defeat of the enemy. The initiative and skilful use of small groups and detachments can assure the fulfilment of the gravest problems of pursuit.

On the preponderant majority of fronts the night takes up half and more of every day in the winter. Consequently, if night operations and battles are not conducted, much time is inevitably lost. When attack operations and battles initiated at high speed develop successfully, nocturnal activities assume a defensive character.

Neither by day nor by night should we give rest to the enemy! Let us make use of darkness for surprise actions, unrelenting pursuit of the enemy, and complete annihilation of his personnel and matériel.

A Bridge Under Water

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a Russian article written by K. Simonov for *Krasnaya Zvezda* 3 December 1942.]

IN A CLEARING in the forest touched by the first frosts of late autumn, sappers were constructing a strange device. If there had been a river here, the structure might have been considered a bridge. But there was no river, only a forest clearing in which were set up seven cribs exactly like those built in the water when the intention is to lay a bridge flooring on them. There were seven cribs set up at a distance of about three feet from one another. This in itself was strange, but stranger still to an outsider would be the fact that tank crews drove up to them and looked them over with a critical eye for a long while.

Division engineer Sosnovkin and tank commander Ievlev examined the cribs attentively, walking around them, and then Ievlev ordered the first of the tanks assembled in the clearing to cross on the cribs to the other side of the area. The tank clambered up on the first crib, then slowly crawled from it to the second across the three-foot interval, and, supported always by two cribs, successfully traversed the whole structure as if on a solid bridge, creeping down to the ground smoothly on the other side of the clearing. After the first tank, a second and third performed the same operation, and so did all the tanks, one after the other.

Everything was strange in this procedure: the cribs set up in the midst of the forest, the tanks occupied with crossing the cribs while the war was in full swing, and especially

the fact that along both sides of the line of cribs markers were thrust into the ground to mark the sides, as on a regular highway—as if the tank crews could not tell where the ends of the cribs were.

But Sosnovkin, Ievlev, the sappers, and the tank crews, in a word, all participants in this activity, were extraordinarily serious about it and very satisfied with the results.

Having crossed the dry-land bridge, the tank men examined it, talking animatedly among themselves; then, getting back into their tanks, they took cover in the forest undergrowth one after the other. Ievlev, clapping Sosnovkin on the shoulder, said with satisfaction that it was splendid and that "if you will have everything in order, so shall we."

This was in the last, dry days of October; there was a lull on the front, and in the clearing only the gusts of wind brought the sounds of intermittent artillery thunder.

On this day in the forest clearing one of the complicated problems of the impending breakthrough was solved. On that sector of the central front, stabilized since August, a river lay between us and the Germans. It was an average Russian stream, not too wide and not too narrow, but nonetheless sufficiently broad and deep to prevent tanks crossing it. For the breakthrough, however, a crossing was absolutely essential.

When General Mukhin received the order to prepare for a breakthrough, he called in engineer Sosnovkin and said: "You must secure the crossing for the tanks, but," and on this word the General paused significantly, "first, the bridge must be built before the attack starts, and not during the course of it, and second, it is desirable that the Germans not know where the crossing is being prepared or in fact that it is being prepared at all."

Sosnovkin requested a day for studying this seemingly insoluble problem. He was an experienced engineer, but in his engineering practice he had never come up against such a puzzling task. In the course of the day dozens of very unusual variations came to his mind, but they were all unsuitable, precisely because they were unusual. Finally, toward morning, rolling with nervous fingers almost the hundredth cigaret, he hit upon the last, and, as he realized, the only variation—the simple one, too simple, simple to the point of recklessness.

Going to the General, Sosnovkin told him that he had found the solution, that he would construct a very ordinary bridge, but a bridge with two, only two, peculiarities. First, his bridge would not be unbroken, but discontinuous, and second, it would not be above, but under water. He would build a bridge with three-foot intervals between the cribs, along which infantry could not move, but tanks could crawl. Moreover, the existence of this bridge would be known only to us and certainly not to the Germans. It would be invisible, its upper extremities being about a foot and a half below water level.

The project was begun; work started at full tilt in two different places of the forest. Cribs were hewn simultaneously for two bridges, a test one for training the tank crews in the forest, and the real one to be submerged in the river.

While the sappers, spitting on their hands, squared the beams and fitted them together, Sosnovkin remained at the front line with the battalion defending the bank of the river opposite the place where the bridge had to be built. Sosnovkin studied the situation. Our bank of the river was low and sloping, as are almost all the left banks of Russian rivers and brooks. The right bank, the German one, was high and precipitous, and during the day it was possible to observe from it everything happening on our side.

At night the Germans, true to their methodical habit, covered our whole bank with the streaks of tracer bullets from the cliff. The bullets hummed over the trenches, bit into

the earth, and splashed into the water with a hiss. Our bank was easily visible to the Germans, and they took advantage of it. There was absolutely no question of building the bridge in daytime, and to build it at night was also difficult. Their bank was too high and steep, ours was too easily observed from it.

How could the cribs be brought up here and put in place without the whole procedure being seen from the other side? Sosnovkin patiently reflected on this, and suddenly a happy thought flashed to mind. Yes, our bank is visible from theirs; well then, we shall carry our cribs up timber by timber, not along our bank, but along theirs.

The same steep cliff which permitted the Germans to see so far in front did not allow them to look at their own feet, to see their own bank, their own narrow strip of shore.

At one place the river made a bend, and from our side a ravine ran down to it. It was possible to haul the beams up here unobserved and then, having moved them across the river, to float them down stream to the place where the bridge was to be. To float them along the shore under the very noses of the Germans! Yes, of course, that was the only way.

The tanks tested the experimental bridge in the woods. Sosnovkin constructed it exactly like the one to be in the river: the same width and length, with the same sort of markers as he later set up with his own hands on both sides of the underwater bridge a quarter of an hour before the attack. On the trial bridge they tested also the minor trick by the aid of which it became a bridge in only one direction, from east to west, definitely not the reverse. On our side there was to slope up to the first crib a dike or incline of stones on which the tanks could easily climb onto the bridge; the last crib, near their shore, sloped down abruptly without any dike. A tank could climb down from it onto the other bank, the west one, but from the west it could not raise itself onto the bridge. This was done in case the Germans should, despite precautions, discover the existence of the bridge prematurely and try to use it themselves. As for our tank crews, they were thinking only of how to get across; whether or not there was a way back concerned them least of all.

In the course of two days all the cribs were hewn out and fitted, timber by timber. Usually they are fitted with iron clamps. But here this method was out of the question. The sappers in the river at night could not permit themselves a single hammer-blow, a single noise, so Sosnovkin had ordered them to make all joints with nut and bolt. The cribs had to be put together entirely with bolts, quietly and accurately. Good Russian carpenters have always cherished a fondness for precise workmanship; and right here and now it was expected of them.

The first dark nights of November came on. The whole sky was covered with heavy clouds; there was not a ray of light, not a star.

In order not to make mistakes it was necessary to try out and figure through every detail of the work. Ordinary marks on the timbers with pencil, chalk, or charcoal were no good. In order to tell with such marks which beam belonged where, lanterns would have to be lit or matches struck, and this, 150 yards from the Germans, was naturally impossible. It was necessary to cut a whole system of notches on the logs beforehand, so that it would be possible to make sure of each one by feel.

On the third night Sosnovkin, with the commander of the sapper company, Kayurov, and his assistant Bykov, began the erection of the bridge. It was a cold, late autumn night. On the surface of the water thin sheets of ice were already forming; to pull the timbers across to the other side, standing chest-deep in the river, then, to swim downstream, pushing them along in the icy water—that was an unbearably cold job even for Russians, accustomed as they are to hardships.

The frigid water made the whole body ache and tempted the men to move the beams into place as hurriedly as possible, to be on their way back as soon as they could, in order

to warm themselves somehow, if even a little, at the fire. But speed could not be made here; the least bit of hastiness, the slightest splash could spoil the whole thing. Two men guided the timbers by hand in the water. Likewise in the water along the German shore, rocks for the footings of the cribs were wheeled in barrows or even carried inside uniform shirts. The rocks were carried with particular care, so that not a single one might splash into the water.

By morning the first two cribs already stood in the river. Neither we nor the Germans could see them. On the following night two more cribs were set up, and again, three. Bullets whistled overhead all night long. The Germans were covering this place as well as the whole bank with their usual fire, "just in case."

Several sappers were killed or wounded. Both dead and wounded were carried back by hand as cautiously and noiselessly as everything else was done. Night by night the water became colder. Now an unbroken covering of thin ice stretched over its surface, instead of the former floating sheets. Hands bled from cuts by it, while the feet became so cold that in the dugouts later in the day even vodka did not warm up the men shivering from the icy chill.

And yet, on the third dawn all seven cribs were in place beneath the water, solid, safely bolted together, footed with rock, and invisible—that was the important thing—absolutely invisible. That last night a heavy frost fell and the river was completely covered by a sheet of ice. "We got it done just in time," thought Sosnovkin, "another day or two and it would have been too late."

Now days of waiting passed. Nobody knew the exact day and hour when the attack would start. And Sosnovkin, as the river froze deeper, watched the fall of water level with some anxiety. Of course he had expected this and purposely had made the top of the bridge considerably lower than the level of the water, but despite that, this level was suddenly dropping unusually low: nature is full of whims. But then, even for this unhappy situation Sosnovkin had a countermeasure ready. He had made preparations so that if the water fell still more he could take off the top layers of the cribs during the night.

Finally the long-awaited time came. At night Sosnovkin and the sappers slipped down to the river, and, cutting holes in the ice, they thrust the previously prepared markers into them on both sides of the bridge. Now it was a real main thoroughfare: the tanks could go straight out on it without losing the road, just as it is necessary to go in an attack.

At dawn, before the eyes of the amazed Germans and to the accompaniment of the thunder of hundreds of guns, the tanks moved straight down to the river and out onto the ice, which, according to all the laws of physics, could not carry them. And leading the way in front of the formidable machines walked a short man in a gray army overcoat—the builder of the bridge, engineer Sosnovkin.

Capture of a Village at Night

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from the German in *Militär-Wochenblatt* 16 October 1942.]

In each issue of the Militär-Wochenblatt there is a section entitled "Attack Lessons from the Eastern Theater of Operations" in which some actual engagement is viewed from the standpoint of a practice maneuver and set down in the form of an exercise. Thus, while the form of this article might lead one to believe that it is an imaginary situation, it is really founded on a real engagement which occurred somewhere on the Russo-German front.—THE EDITOR.

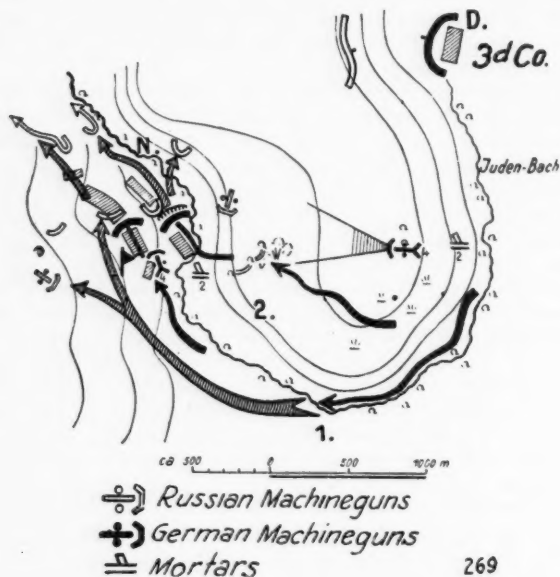
SITUATION: 1st Battalion, not supported on the right or left, has on 15 December at 0:00 midnight, captured the village, D., by a thrust from the east.

The mission: To take N. during the same night and continue the attack to the west.

The enemy after stubbornly defending D. has taken up new positions on the high ground west of D. with at least five machine guns. The strength of the enemy in N. is not known.

Weather: Temperature, 30 degrees, full moon, 80 centimeters (about 31 inches) of snow.

Fights for villages will be accomplished with few casualties only by those troops who have mastered the technique of



such fighting and who are accustomed, by combat firing practice, to the picture of a night attack on a village.

With the significance that fights for villages have in all campaigns, it is useful in training to construct a mock village, in which on a small scale all those targets appear and all those situations come up that must be expected in a real battle.

Therefore it is best to use the company in combat firing practice; still better and simpler to use the reinforced rifle platoon.

The battalion has attacked every night since 2 December and has had good success in the moonlight, with few casualties. Morale is good, therefore, in spite of the difficulty of the task due to lack of sleep. Most people are keenly affected by failures.

In D., by means of fast work, the 3rd Company has captured trucks, machine guns, cannon, and food. After a period of stiff resistance the enemy has withdrawn to the high ground west of D. and is now holding D. under machine-gun fire.

A small stream, the Judenbach, goes around the hill and heads toward D. It appears to be suitable for a covered approach. It now seems unlikely that the enemy in N. can be surprised.

The combat plan of the battalion commander: Formation to be used by the battalion in approaching the Judenbach: The reinforced 3rd Company is to hold the enemy opposite it pinned down by its fire and at the same time lead the enemy to believe that the whole battalion is still there. The main body of the battalion is to move in file toward the south at 10:00 PM.

Order of march: In the lead, one group belonging to the 2nd Company. 1st section: battalion staff, commander of 1st Company, 2nd Company less one group. 2nd section: staff, machine-gun company (less 1 platoon and one heavy trench mortar group), 1st Company.

Eight hundred meters south of D. there ensues a short exchange of fire with the security group of the 2nd Company. A group of the enemy is running along the course of the stream in the direction of N. On this account the chances of a surprise seen to be definitely over.

Decision of the battalion commander: No use in trying, it is impossible to surprise the enemy now. The men must establish themselves in a position and get the guns ready.

A heavy machine-gun platoon and a heavy mortar group go into position on the slope with orders to fire immediately as soon as a shot is fired on the attackers in the village. This is particularly hard for the heavy mortar group who have but 21 rounds with them. They must not open fire too soon for in that case they would be out of ammunition at the crucial moment, that is, as the troops approach the village.

The location of the battalion staff now shows its advantages; the battalion commander has an equal view of the enemy's situation and the terrain. In this connection it is important to understand that the commander can lead safely only what is back of him. In the battle, the commander should lead, not push.

He gives the commander of the 2nd Company the order to send a platoon over the section of slope to the left of the machine guns, straight toward the village, while the main body of the company and of the battalion follows the course of the stream farther on. By this means, combat reconnaissance can be accomplished by a partial attack, and at the same time enemy forces can be diverted.

The platoon advances with one group in skirmish line formation, the other groups being considerably distributed in depth. The terrain becomes closer on the descending side of the slope. A cloud passes in front of the moon. Suddenly a salvo of hand grenades explodes in the ranks of the leading groups. They have been thrown from very close at hand. The other groups immediately rush at the enemy and bring him down with their shovels, rifle butts, and pistols. The ammunition carriers with the machine gun throw an ammunition case in the face of a hostile soldier who suddenly shows up, taking him by surprise and giving them the opportunity to get him.

In the meantime the other two platoons of the 2nd Company have seized the outermost house on the left of the village. It is immediately set on fire. Machine-gun fire is then laid on targets that stand out clearly for a few moments in the light of the fire. The attacking group is flanked time and again by rifle fire from the left but in spite of this it slowly continues its advance. Every house and every cellar has to be taken separately.

After the mortar group has subjected the right side of the village to heavy fire, the platoon on the right also succeeds in breaking into the first houses.

In the center of the village losses are suffered. Messengers who are obliged to dash from the right to the left or to the rear are shot down by enemy riflemen who cannot be located. Taking care of the wounded who are lying in the streets of the village requires heroism on the part of the medical personnel.

The enemy's resistance has stiffened considerably. The company commander is wounded as he tries to lead an attack from the gravel pit on the right, and he has to retire to the rear. A young lieutenant takes command of the company. In this difficult situation he has to know how to command. The company depends on him.

Renewed attempts to attack to the left fail on account of fire coming from close at hand in the village and from somewhere to the left. The whole of the portion of the village that has been taken is on fire.

The battalion commander springs forward. Some of the wounded men feel that the village should be evacuated for the present and attacked systematically in the morning.

The heavy trench-mortar group that has gone into position in the village can scarcely see that its fire is having any decisive effect.

The heavy machine-gun platoon can seldom find a position. Most of the weapons such as the light machine guns are being fired from the shoulder of a comrade.

Shall the battalion commander bring up the 3rd Company?

Shall he send the 1st Company also into this fire, or perhaps only portions of the 1st Company?

Is the 1st Company able to encircle the village without being turned aside by the fire?

The decision of the battalion commander:

The commander of the 1st Company has talked with the wounded commander of the 2nd Company and in addition has talked with the lieutenant and has made a good survey of the situation. He has not found the battalion commander.

Immediately afterward, he leads his company along the course of the stream until he is close to the first houses, then organizes them for an attack and reports this to the battalion headquarters.

The battalion commander brings up the heavy mortar group that is still in the rear and orders a new attack by all units at 3:33 AM.

At the appointed time the 2nd Company on the right and the 1st Company on the left break out from behind the houses with a loud yell and put to flight all the enemy that is not shot down.

At the same time a half platoon is sent to the left to roll back the enemy who are on the slope. Later a group from the 2nd Company on the right takes a barn that was still in the hands of the enemy.

The village, which is now completely on fire, is taken.

The reorganization of the rifle companies, the following up of the heavy weapons, and the launching of the second attack are slowed up by the excitement of the battle and the normal confusion. Hence, the battalion gets into the fire of an enemy "salvo-thrower" whose effects are more moral than material. However, the commander of the 1st Company is wounded in this fire.

During the same night the battalion takes another village and in the early light of dawn repels an enemy counterattack. In spite of exhaustion the men are filled with elation over their victories.

Lessons:

1. When surprise no longer appears possible do not attempt to *coup de main*. Stop and reorganize the attack.
2. Reconnoiter frequently by means of a partial attack. This, at the same time, will deceive the enemy.
3. Even during the attack it is often necessary to reorganize, regroup, and order a new general attack.
4. No enemy can withstand an attack executed with great energy and shouting.
5. Do not hesitate once the attack has succeeded. Keep on the run under artillery fire.
6. A great deal of ammunition should be carried in night attacks in order to have sufficient to withstand enemy counterattacks at daybreak.

with the practices of the new war, and the army cooperation airplane, which was so assiduously cultivated in the past ten years and brought to a high state of perfection, had to be discarded in favor of an airplane with quite another set of qualities.

All the commendable attainments of the army cooperation types had been fostered in the belief that the army's airplanes would have to fly from the military commander's doorstep and not from equipped airdromes. Every meadow had to be a potential landing ground—and by fitting lift-preserving devices with a lavish hand, designers produced airplanes which could insinuate themselves into and extract themselves from fields of the fewest acres.

Nor were these accomplishments the sum total of their special virtues. They were hung about with numerous hooks on which to load supplies for beleaguered garrisons, they were given cameras and radio sets, equipped with a shepherd's crook for picking up messages, given powerful lights with which to land in the dark, and armed with guns to defend themselves.

But all their ingenious devices became mere ornaments and their spectacular landings and take-offs nothing more than acrobatics when the fighting started and army commanders wanted intelligence of the enemy's dispositions. With all their attributes they had not the legs to escape from the swift, hard-hitting fighters, nor the gun-power to shoot them down, nor the agility to dodge the accurately aimed anti-aircraft shells. The tempo of war had increased, and loitering in the highways of the skies was as dangerous as dawdling on the crossroads.

The army cooperation types had been made too versatile. They could turn any field into an airdrome; they could take good photographs, bring succor to troops in distress, send and receive wireless signals, swoop between two poles and lift a message off a string, but they could not often collect and bring back the information demanded by the army they were supposed to serve. Their versatility was their undoing. War had no time for machines of many parts; it gave victory to those designed for a single purpose.

A revised specification had to be drawn up for the army cooperation airplane. In it high speed took top place. The ability to land in and take off from meadows was not mentioned; nor was it stipulated that the new type should be able to drop supplies to isolated troops, or pick up messages from ground stations, or to fight, or to land unaided in the dark. Guns were needed, but only for self-defense. The pilot with information to deliver dare not stop to pick a quarrel with an enemy, however confident he might be of victory. A moment's delay might lose the day. Yet he had to have the means to cause confusion and casualties among the enemy's columns when occasion demanded. For escape, if accosted, he must be able to rely on speed rather than armament, and must use his guns in combat only to shoot his way out of a tight corner.

Light and positive controls were set high in the specification. Often the pilot would have to skim hedges, breast hill-tops and leap over roadside trees, if he was to get the information he had been sent to collect. He would have to travel fast and low, and to be able to judge distances within inches. He had to be provided with an airplane which would respond instantly to the merest touch of the controls—or calamity might overtake him.

Those, briefly, were the principal needs of the new army cooperation airplane, and they took the practice of military aeronautics back to the Great War. Ironically, all the Army really needed was an improved version of the Bristol Scout.

No scout, as such, existed in the range of British airplanes, and the R.A.F.'s preliminary choice fell upon an American fighter which had just been taken out of first-line service—the Curtiss Tomahawk. But this proved to be only a stop-gap,

Fighter-Reconnaissance for the Army

[An article from *The Aeroplane* (London).]

THE SCOUT has returned to the army cooperation squadrons, and the science of military aeronautics is back at its starting point. The theories of the last peace did not accord

and the second choice fell upon another but newer American type.

This was the North American Mustang. Like the Tomahawk, the Mustang was designed as a fighter, and its use as an army cooperation scout in no way detracts from its value as a fighter in certain circumstances. It was chosen because it possessed the two primary qualities needed in the new army cooperation airplane—high speed low down and sensitive controls.

Mustangs have already proved their suitability for the work they will have to perform. In maneuvers in England they have shown themselves competent to keep the enemy under constant surveillance and allow accurate reports to be made not only of an enemy force's movements but also of its components. At the same time, they offer themselves as the briefest targets for the enemy's guns and fighters.

The quick recognition and identification of all types of military formations and their equipment, from push-cycles to heavy tanks, forms an essential part of the training of army cooperation pilots. In one large exercise held in England recently the pilots of a Mustang squadron successfully located an "enemy force" expertly camouflaged and hidden in a large wood. They had noticed a faint blue haze above the trees, suggesting field kitchens at work. At dawn next morning they were back over the wood in time to observe the "enemy" emerge from concealment and move northwards.

Hour by hour they reported his progress, informing their army commander of the strength and composition of each column, its speed and route. The commander was thus able to meet the attack and the enemy was duly routed.

But exercises, however realistic, cannot give war experience, and Mustangs of the Army Cooperation Command have been taking part in fighter sweeps with Fighter Commands over Northern France and the Low Countries. They have specialized in low flying attacks, hunting in "packs" of two or three, and have satisfied their pilots that they can take heavy punishment and survive. One Mustang had an ammunition box hit by an enemy shell. The ammunition exploded, tore a hole in the wing and sent splinters flying in all directions. Some hit the pilot in the leg, but neither this nor the structural damage prevented the airplane from making a safe return.

On another occasion, a large anti-aircraft shell passed through a wing of a Mustang but did not bring the machine down. On the first sortie (which was made by a single Mustang) the pilot hit the aerial between two masts of a radio station with his wing, but it was the aerial which came off second best.

Though the Mustang is one of the noisier single-seat fighters now flying, its speed near the ground allows it to approach the target in silence. Time after time, in a recent demonstration, Mustangs swept up to a small knot of spectators unheard, but their departure was as shattering as their approach had been quiet. The silent approach is one of the machine's greatest assets. Every advantage is taken of ground cover both on the outward and the return journeys and unless the terrain is abnormally flat and treeless, complete surprise can usually be effected.

Fortunately, the pilot's speed is not so great that he cannot observe the things he is looking for, and once clear of the target area, he jots down his observations and sends them to base by radio. A few minutes later he drops a message bag at the base containing his written report. Often the military commander knows the enemy's position and strength within three minutes of its being discovered by the pilot.

Many of the men flying Mustangs with the army cooperation squadrons are seconded army officers who had been specially trained for army cooperation work before learning to fly. The remainder are pilots of the Royal Air Force who

have been posted to army cooperation squadrons in the normal way and have no particular qualifications beyond their flying skill. But they soon learn the trick of assessing the strength of military formations, the size of guns, the types of vehicles, and of detecting camouflage—all in a fleeting glimpse.

How soon they will be in action with the Army doubtless depends upon the opening of a second land front in Europe, but in the meantime their constant exercises in Great Britain and their periodical visits to France and the Low Countries are steadily perfecting their skill, improving their knowledge and preparing them for the day when they will serve the Army in earnest. And never will the Army have had faster eyes than theirs.

Artillery Escort for Tanks in Attack

[An article by Major V. Smirnov, Soviet Army. Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from the Russian in *Krasnaya Zvezda* 4 December 1942.]

TANKS are protected with strong armor and are equipped with machine guns and cannon. In comparison with other kinds of troops, tanks have great advantages in maneuverability and striking power. Not without reason have some military specialists put all their confidence in tank troops, relegating the artillery to a secondary position. However, the experience of the present war has shown that the presence of a large number of tanks does not at all lessen the role of artillery; it even increases it. Tank thrusts require the dependable protection of dense artillery fire. As a rule, tank attacks without the aid of artillery become stalled and the tanks roll back to the starting positions with losses.

There is nothing surprising in this. Modern defense is primarily antitank defense. An abundance of varied means of combating the armored arm distributed along the front and in depth, and well concealed, enables the defense to withstand massed tank attacks. The tank crews are not able to detect and crush all these elements. Observation from tanks is difficult, the range of fire is limited, and accuracy is relatively low. It is very difficult to produce aimed fire from a rapidly moving machine when it is diving into shell-holes and climbing hills. Moreover, the forced stops at obstacles and when break-downs occur increase the vulnerability of tanks. Under such conditions it is impossible to make use of such valuable qualities of tanks as maneuverability, armament, and striking power, without additional help. Artillery, in the main, gives tanks this help.

The question arises as to the effective use of artillery in securing the actions of tanks. There still are, unfortunately, imperfections in this matter. Commanders do not always have a sufficiently clear idea of what the organization of a battle should be in this case. Sometimes impossible tasks are imposed on the artillery, but more often the power of the artillery is underestimated, and the tanks attack a defensive zone of the enemy with undisturbed system of fire. Here, of course, it is not possible to give any prescriptions effective for all contingencies. The solution of such questions in practice is unthinkable without the concrete tactical situation. However, the experience of many months of war, and especially the present offensive by our troops in the region of Stalingrad, permit us to observe some general principles, on the basis of which one must proceed in organizing a battle.

First of all we emphasize the wide range of tasks possible for artillery, whose fire as always has the greatest power and range. It can cover the advance of the tanks to the line of departure and their concentration, it can secure the passage of the tanks up to the objectives of the attack; in the attack itself, it can parry the counterthrusts of the enemy,

and it can cover the assembly after the attack, the development of further actions, and the evacuation of wrecked machines from the battlefield. The artillery prepares the entrance of large tank groups into breakthroughs and also cooperates in the advance of individual machines. The methods of solving these problems are manifold, and are as different in magnitude and nature as the problems themselves. Here are applied the concentration of fire of entire artillery groups, the transfers of fire, and the direct accompaniment of tanks by fire and on wheels.

The important thing is that the activities of the artillery should be thought through previously for all these stages. Otherwise, all its efforts may be lost, as indeed occurred on a certain section of the front. Here the artillery prepared the beginning of the tank unit's activities well. It silenced an enemy battery and reduced the activity of his other fire elements, while the tanks moved out to the forward edge of defense. The roar of the motors was drowned by the noise of the fire, making possible surprise in the tank attack. Finally the tanks moved forward in deployed order. The object of attack was soon near, when suddenly one machine after the other stopped. It appears that they had run against a zone of continuous fire which had kept them from reaching the antitank obstacles. The Germans had brought antitank units into action, which up to then had not been detected. It was essential to crush them immediately, but there were no accompanying guns. It was not possible to fire from the concealed positions for fear of hitting our own tanks. As a result, instead of developing the attack, it was necessary to take measures to cover the withdrawal of the tanks. The cause of this failure was in the interruption of the continuity of artillery support.

How, then, should such action by tanks be secured? We shall confine ourselves to general situations, presupposing that we have sufficient artillery units. At this period of the war this is the case for all parts of the front.

The enemy, of course, tries to expose and destroy the attack prepared by our tanks. For this purpose he utilizes long-range fire with the power of two and even three divisions of artillery, training on the march route of the tanks, on the tanks, on the areas of concentration, and on the starting line. To this end German aviation is active. That means that the first task of our artillery is to secure the approach of the tanks and their massing by means of counter-battery fire and the repulse of hostile flights.

In counter-battery fire, it must be borne in mind that long-range fire usually is carried on from reserve (alternate) positions, of which there will be several. It is necessary to register them as quickly as possible, in order to answer as soon as they open fire. It must not be forgotten that the hostile batteries cannot fire accurately without observation. That means that during periods of artillery activity in zones of defense and in further activity it is necessary to destroy and obliterate the enemy observation posts, which will reduce his fire activity to some extent.

Counter-battery fire is carried on also when the tanks have started to advance. The Germans meet them with a barrage at a distance of four to five kilometers (two to three miles). During this time our artillery must try to bear on the hostile batteries, to upset their firing calculations, and to hinder the enemy's direction of fire.

The basic and most complicated task of the artillery is to disrupt the enemy's system of antitank security. Frequently our artillerymen open a powerful fire from the first moment against the forward edge of the defense, assuming that the antitank guns, obstacles, and the basic antitank units will be there. But the majority of these antitank elements are dug in the ground, concealed, and passive, up to the given moment. Even if some object is exposed, this object often proves to be false or transitory. Shells must be saved at the start of bat-

tle, awaiting a more suitable moment for the annihilation of hidden objectives.

As the tanks move up to the forward edge of defense, the work of artillery becomes more complicated. At this time particular speed and flexibility of control is demanded. Obstacles will be encountered along the routes of the tanks. The hostile fire elements, located in the immediate vicinity of the forward edge of defense, will begin to speak. Our batteries will have to switch to the bombardment of the forward edge and to the fire accompaniment of the tanks. The shell bursts must be placed at just such a distance from them as not to endanger our own machines (200 to 300 meters: 220 to 330 yards).

The method of fire accompaniment is the successive concentration of fire on combinations of definite targets. Trying for accurate fire in such situations must not in any case involve delay in firing. Often a solid wall of bursts is more desirable, the more so as the Germans will have given up at once the broken line of defense. (Not understood—Ed.) Intensive fire, opened up without delay and even if inaccurate, will cause the enemy to decrease the activity of his antitank units.

For fire accompaniment of tanks, all the artillery groups supporting the infantry, and units of the long-range batteries, are brought into action. The latter, in general, fulfill the tasks of hemming in the objectives of attack in the depth of the enemy's defense, of securing our reserves thrown into the breach, and preventing counterattack. The direction of fire is conducted from advanced posts. It is necessary to have call and correction of fire by advanced observers in tanks equipped with radio.

Since the artillery fire shifts ahead as the tanks move along, what is to be done with those objectives which remain even after massed bombardment or which are in concealment for thrusts at the rear? What is to be done with machine-gun nests located between the lines of artillery fire? Of course the tank troops cannot cope with all these objectives. Guns are needed for direct tank support. Accompanying the tanks on wheels, they must promptly destroy everything that hinders the tanks in the accomplishment of their basic task. The overwhelming importance of the activities of these guns is clearly shown by the experience of many attacks in the region of Stalingrad and on the central front. Distributing their reserves, which are mainly tank troops, in the nearest defensive depth, the Germans try to organize a counter-attack as soon as a breakthrough begins. In one battle, five of our tanks, accompanied by four guns, were subjected to a counterattack by seventeen enemy tanks. Our artillerymen were following at a distance of 400 to 500 meters (440 to 550 yards) from the machines. Taking advantage of the fact that the Germans had concentrated their attention on the tanks, the guns were quickly deployed and opened fire. As a result of thirty rounds, two tanks were set on fire and four were destroyed. The remainder speedily retreated, and our tanks successfully completed their mission.

More and more attention has been given recently to guns for tank support. Our artillerymen are diligently studying ways of better cooperation with the tanks, in order not to become separated from them when moving and to maintain communication with them in battle. In this connection, the experience of an artillery battalion command by Senior Lieutenant Kryukov is of interest.

A rifle unit was ordered to take German positions in an inhabited place. Tanks were used in the battle. A battery of 45-mm guns, commanded by Senior Lieutenant Perkal, was assigned to accompany them. The artillerymen operated in an unusual way. The guns were hauled by the tanks with cables, and the gunners, armed with automatic rifles, took up positions on the tanks, where they also placed a part of the ammunition. The result was an artillery "tank-borne party."

On approaching the front line and in the capture of the first line of trenches, the artillerymen used their automatic rifles on the Germans, who were trying to set fire to and blow up the tanks, while the tank crews took care of the machine-gun nests. In the depth of defense the tanks came up against serious natural obstacles. They had to stop. Then the Germans threw a unit of infantry and three tanks into a counterattack on the flank. At a signal from the battery commander, the guns were quickly unlimbered and brought into battle position. The gunners disabled the counterattacking German tanks with direct aim and dispersed the infantry. When our infantry came up, the battery shifted to its support. Moving with the riflemen, these guns destroyed two heavy and three light machine guns.

This example is not typical, inasmuch as the artillerymen, during the struggle for the forward edge of defense, had to act as automatic riflemen. But the hauling of guns by tanks and the carrying of their crews on the machines deserves attention. Here is evident the closest cooperation of the artillery with the tanks to be supported: at the decisive moment, the guns are right beside them.

Of course, such a way of accompanying tanks has serious shortcomings. A more acceptable method for guns following tanks is with their own prime movers, at a distance of 200 to 300 meters (220 to 330 yards) advancing by stages from position to position. Thus the guns can cover the flanks of the tank units against counterattack and flanking machine-gun nests, which are very dangerous for tanks.

On the eve of battle, the tank and artillery commanders should develop with particular care, and necessarily by means of personal reconnaissance on the terrain, the successive stages of attack, movement, and cooperation, and should arrange signals for the call and cessation of fire. In the course of combat it is very difficult to accomplish target designation. For this reason it is the obligation of the artilleryman to observe closely everything that occurs on the field of battle, and on his own initiative to destroy objectives which threaten the tanks.

Finally we shall mention once more that the questions of artillery protection for tanks are very serious and important. Their positive solution allows the tanks to accomplish great results with minimum losses. The main thing required of the artillery is the uninterrupted support of the tanks from the moment they move to the positions of departure up to the time the breakthrough is accomplished.

The Lessons of One Battle

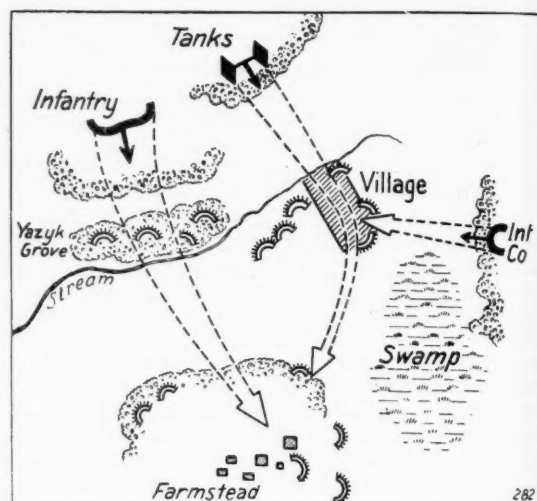
[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a Russian article by Major V. Shuvalov, Soviet Army, in *Krasnaya Zvezda*.]

IN THIS SECTION of the front the German defense cuts into the disposition of our troops like a wedge. The point of the wedge ends in a settlement overlooking the surrounding locality. The Fascists had been constructing engineering works here during the course of several months. They had converted the inhabited place into a strong center of resistance with a widely developed system of defensive works, communication trenches, and good camouflage. In the forest west of the village our reconnaissance detected up to ten log and earth fortifications, whose approaches were protected by two rows of barbed wire. Defensive works were also detected at a farmstead on the outskirts of the forest.

Not long ago one of our units undertook a local operation here in an endeavor to destroy the hostile center of resistance, to straighten the front line, and thus to liquidate the permanent threat of a breach in its own positions. The

infantry was assigned tanks, artillery reinforcement, and sappers. Its operations were supported by a small group of planes. However, despite the presence of these elements and a sufficiently long preparation for the action, no success was achieved in breaking up the hostile defense and fulfilling the intended mission. What were the causes of the failure?

When the battle was planned it was decided to attack in two directions (see sketch). The infantry, supported by artillery fire from a concealed position and by eight guns dis-



posed in a clearing for point-blank fire, was to attack the German fortifications in Yazyk Grove. The next task was to drive the Germans out of the defensive works in the woods south of the village, to seize the farmstead, and to consolidate behind it. A tank company bearing automatic riflemen and sappers atop the armor, supported by accompanying guns, was to attack more to the east, that is, directly on the village. As soon as even a single tank came out on the south edge of the village, an infantry company was to rush in from the woods east of the village, dig in, and consolidate the success of the tanks. Then the tank company, in the event of successful action by the infantry in capturing Yazyk Grove, would immediately attack the Germans in the farmstead. If the infantry should be delayed, the tanks would turn westward from the village, cooperate with the infantry in driving the Germans out of Yazyk Grove, and then operate in the direction of the farmstead.

Thus the direction of the main thrust was not precisely defined. The strength of the attackers was dispersed in the very beginning of the operation, and the infantry lagged and became separated from the tanks. The tanks and the infantry were compelled to operate virtually on their own, without any mutual support whatsoever.

In making such a decision, the commander was guided by the thought that it is more difficult for tanks to combat firing positions in a wood than in a village. But experience has shown that an inhabited place, organized beforehand for defense, harbors still more surprises and shocks of all sorts for tanks.

How did events turn out? During the night the infantry, the tanks, and the guns assigned to point-blank fire took up their positions of departure. At dawn several of our planes bombed the enemy positions in the village and raked the woods south of it with fire. At a general signal all the artillery opened fire simultaneously and the infantry and tanks moved to attack.

Relying on the suddenness of the attack, a preparatory artillery bombardment of the enemy defense had been omitted. The artillery was not, in fact, given enough time for the de-

struction of the German defensive works. To be sure, the sixteen guns (of which seven were divisional guns) disposed for point-blank fire executed their mission with great effect, and in a short time they demolished more than a score of dugouts on the north edge of the village and on the outskirts of Yazyk Grove. But the batteries firing from concealed positions could not, by a short bombardment, destroy the permanent fortifications of the enemy in the village and in the rear.

It should be noted that the commander directly responsible for this operation had insufficient heavy weapons at his disposal. All the artillery reinforcement was concentrated in the hands of the senior artillery commander and was used by him for fire on the deep rear of the enemy. After the start of the attack the aviation also did not subdue the German positions immediately in front and on the flanks of the attackers. Together with the reinforcing artillery it acted against the tactical rear of the enemy defense. It was not fully realized that the Germans had been erecting defensive works in this sector for many months and had dug themselves deep into the earth: as it was, the main strength of all neutralizing fires should have been brought to bear directly on the forward edge.

When the infantry reached the barbed-wire entanglements in Yazyk Grove they came under the heavy action of unsilenced German firing positions. Passages in the wire were covered by heavy mortar fire. The infantry companies were forced to take cover. The tanks might have helped, but at that time their first echelon, having crossed the brook, was already breaking into the village. Here, however, just as in the case of the infantry in its sector, the tanks encountered many unsilenced firing positions and were subjected to bombardment from the rear. Of four tanks not one was able to break through to the south edge of the village. The infantry company trying to break into the village from the adjacent woods (east of the settlement) was pinned down by strong enemy fire.

Later the commander made an effort to correct the error committed at the start. A unit of infantry turned its front toward the east in order to attack the village at the same time as the tanks. But by this time the Fascists succeeded in setting up a heavy screen of artillery fire along the brook, which the infantry could not cross. The second echelon of tanks, trying to force the brook a little to one side of the path of the first echelon, was not able to do so because of poor organization of the crossing.

Thus the chief cause of the failure of the attack was that the blow was delivered in loose fashion. The available forces were dispersed in two directions and the infantry operated separately from the tanks. Other blunders were the omission of preparatory artillery bombardment of the forward edge of defense and the dissipation of neutralizing fires which acted primarily against the hostile rear without consideration of the needs of the moment.

Panic— A Decisive Factor in War

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a German article by R. Petersen in *Militär-Wochenblatt* 27 November 1942.]

TO THE QUESTION as to what circumstances create panic in war, one can only answer that these circumstances may be of a thousand kinds and very different from one another. Nerves overstrained by mental or physical overexertion, marches under terrifying conditions, attacks from ambush in the dark and in close terrain, and long bombardments are only a few of the main causes for the occurrence of panic. It is one thing

to talk of steel nerves at home or in quarters, and another to see one's comrades falling and to be but a few yards from bayonet points. Fatigue, hunger, and insufficient knowledge of the enemy and his operations are dangerous kinds of sickness which make it easy for panic to get into the ranks.

A case that occurred in the Finnish winter campaign of 1940 on the Karelian isthmus, described by First Lieutenant Lipponen, is a good illustration: "I noticed now for the first time, to my horror, that the whole group of rapid-fire troops had left its post and was behind our positions. I asked sharply on whose order they had left their positions, whereupon they answered me that they had no commander and that the Russians were behind us. I then told them: 'I will immediately obtain information concerning the situation on our flanks and back of us, but now every one of you go to his firing position and remain there until another order is given. If we are surrounded I will lead the breakthrough.' The men immediately obeyed my order and I assigned a noncommissioned officer to them. As I was no infantryman the affairs of the infantry were really no business of mine, but in such a case it is one's duty to act promptly and independently even when this is contrary to the official regulations."

This case is a good example of what resolute action can do in a military situation. Further, this example teaches us that all means must be used to combat idle rumor, for this is a force which parallels enemy propaganda in the operation of panic. We must watch carefully under such conditions that no man leaves his place without express orders.

The well-known Colonel Lawrence reports an interesting case that occurred during the first World War. He writes thus in his memoirs: "Among the Arabs as well as among the Turks entire chaos and panic reigned. On the one side panic and on the other side the flush of victory, mad goading on, cruelty, etc. The German detachments alone were an exception. I could feel pride and respect for the enemy. The German troops were 2,000 miles from home, without hope of guidance, and in a situation that was sufficient to break down the strongest nerves. But in spite of this the German formations held firmly together and plowed along like a battleship, silent and with heads high, through the confused ranks of the Turks and Arabs. Whenever they were attacked they stopped, assumed a fighting formation with great coolness, and fired only when ordered. There was nothing done here for the sake of appearance, no unnecessary shouting, no doubt as to their duty. The German troops were magnificent . . ."

It is certain that in this case the possibilities for the appearance of the phenomena of panic existed. But on the other hand, this example shows how a well-disciplined, well-organized unit, even under the most trying circumstances, fights down the least tendency to panic. Lundberg shows in his book, *Begreppet Psykologisk Massa*, 1941, how a wrong idea may easily produce panic. A young officer received the order to capture the enemy's food carriers and orderlies who, every night between 12:00 o'clock midnight and 1:00 AM, passed over a narrow path in the woods. To help him the officer was given a machine gun and six riflemen. In order to keep the rear clear the machine gun was stationed about 40 yards back in the woods, while the riflemen were stationed along the road. Instead of the usual food carriers, there suddenly appeared a whole company of the enemy. The officer became nervous and ordered his men to fire, but the enemy calmly went into skirmish formation and also opened fire. The group under the officer became panic stricken and fled.

Now what does this episode teach us? First, that we must make effective use of our weapons with strong fire power (a thing the young officer did not do). Second, that we must be ready for a surprise attack at any time. Third, that we should be well aware in advance that even a task which seems easy is often very hard to accomplish. The psychological cause of the panic in this case was mainly that the men looked on their

task as much too easy and therefore they were too optimistic. We should be on guard against false ideas and never underestimate the difficulty of an apparently easy task. This will free us from the panic resulting from false ideas.

During the winter campaign the Finnish forces made successful use of panic as a means of combat. Fast Finnish ski patrols glided past the Russian lines in the dark of the night. Then, while the Russians were quietly lying around their fires, machine guns suddenly began hammering from the rear. Pure panic took hold of the Russians. They opened fire at random, and in so doing fired almost exclusively on their own troops. Before the Russians learned the true state of affairs the Finnish ski patrols had vanished. From the great number of examples at our disposal we shall mention one from the First World War. In the year 1915 German troops, while engaged in an attack, had to cross a bridge. The infantry was able to pass over the bridge but it was necessary to reinforce it before the other formations could cross it. Unexpectedly, fire of very great intensity was opened on them from both flanks and from the front. The men were ordered to retreat while complete panic reigned. The well-organized formation became a crowd without a will. Suddenly the adjutant shouted a loud hurrah. This cry was taken up by all the men and in a moment the apparently leaderless formation had again become a strictly organized military unit. A successful attack was made across the river, the hill was stormed, and the enemy driven back. This is a good military example of how lightning-like action may rescue a situation. The right word at the right moment may prevent a panic.

A form of panic that is perhaps even more dangerous often and easily ensues when a unit first makes contact with enemy tanks. This fact shows the importance of joint exercises in time of peace by the most varied types of troops against tanks. As we look through recent Finnish military reviews we often find attention called to the value of the exact knowledge obtained by Finland's military command concerning the various forms of panic which resulted from the lightning-like German operations in 1939-1940 in the Polish, Norwegian, Dutch, Belgian, and French armies.

There exists in time of war the danger of panic resulting from bombing attacks on the civilian population in the cities and towns of the home front. A Finnish military writer (Colonel Halsti) calls attention, in a remarkable military work regarding Finland's defense, to the fact that panic is easily able to do more damage than air attack among the civilian population. It is of great importance, he states, that it be repeatedly called to the attention of the civilian population that the mental effects of aerial bombardments are often much more dangerous than are the purely material effects.

Naturally there are many more forms of panic than can be treated within the limits of a short article. The French fortress crews from the Maginot line can tell many tales about panic. We can therefore agree with the military psychologist, Svenson, who states: "Panic occurs in the greatest imaginable number of forms, but as a rule only with soldiers who are poorly disciplined and who possess a low order of intelligence, and it can be very largely combatted by the proper tactical exercises . . ."

Air Intelligence at Work

[From an article in *The Times Weekly Edition*, London, 4 November 1942.]

INTELLIGENCE RELIES for its success very largely on an understanding of everyday things and on common-sense interpretations of slender facts which signify little until they are linked up to others and fitted together like a jigsaw puzzle. Rarely is success spectacular; more often than not it is the

result of patient research and keen observation by many people and of the careful sorting of a mass of detail, much of which may be misleading.

When the newspapers report a heavy raid by our bombers on an industrial town in Germany—let us call it Mitteldorf—there is some special reason why, with all the Reich to choose from, this particular area has been singled out for attack at this time. The origin of the operation may date many months back, when the *Mitteldorfer Zeitung* contained an unobstrusive paragraph about a speech made at a dinner by the head of a small local engineering works. While his speech gave no concrete details, it indicated that the firm had just done a good stroke of business. A few weeks later the chance sight of a letter in a South American office revealed that the K.U.G. Company, of Cologne, regretted their inability to discharge an order for precision instruments. This is a point worth noting, for Germany had made strenuous efforts to supply her South American customers, so that the order must have been turned down for some good reason. Then another germane fact is noticed. K.U.G. though not linked directly, is recorded as having sometimes in the past sub-contracted to S.U.V., of Mitteldorf. The file is consulted; the newspaper cutting hinting at S.U.V.'s expansion is found; the evidence is beginning to accumulate.

More is found by roundabout means. A German business man has been in Switzerland trying to persuade skilled watch-makers to take jobs in Germany. He comes from Mitteldorf. From a neutral source it is learned that trains are being held up outside Mitteldorf while heavy goods traffic is shunted on to the branch line. A reconnaissance aircraft is sent over to photograph the Mitteldorf area. The pictures are fitted together into a mosaic, enlarged, scanned by experts through special lenses, and the layout of a camouflaged factory is discovered. Further photographs are secured and are sent to engineering experts, who suggest that a specialized high-grade component is being manufactured there. Soon afterwards an enemy minelaying aircraft crashes on a mudbank in an English estuary, and when it is salvaged markings show that certain components were made at Mitteldorf. The dossier is now complete; the raid follows. These are merely examples of intelligence work.

The strategical aspect of intelligence is of the utmost importance. The Air Force is at present the only weapon which enables us to penetrate into the heart of Germany. It is not enough for the enemy to be hit hard and often; he must be hit in the right place, and the task of intelligence is to discover his solar plexus and to advise how his defenses can be evaded with the minimum cost. During the heavy air raids on Britain during 1940 and 1941 we obtained first-hand information about what bombing can and cannot accomplish, and the lessons learnt are being turned to good account against Germany.

We know not only the weak spots in the enemy's economic structure, but, perhaps equally important, which of these our bombers can tackle. Targets, which, from an economic standpoint, should be destroyed are often unsuitable for bombing; but we have learnt how to select one fit for hitting and worth destroying. Rostock provides a good example. It was a thriving industrial center, advertised as such by the Germans themselves in a long article in their illustrated press, published shortly before the R.A.F. attacks took place. Being on the seaboard of the Baltic, Rostock was easy to find; strategically a successful attack would cripple a port used by the Germans in their war against the Russians and would dislocate an entire section of the enemy aircraft industry. Clearly a desirable target from every point of view. Rostock was selected and the task was well and truly carried out by our bombers.

But once a target has been selected pilots must be advised how best to avoid the enemy's defenses, searchlight, flak, or night fighters. On his return from a raid on Germany each

pilot is asked for details of what he has seen and done, so that the information may be sifted and analyzed. In this way a picture of the enemy's defense system is gradually built up. Decoy targets, dummy fires, and dummy towns are carefully plotted, and bomber crews are briefed to avoid traps designed to destroy or mislead them. A pilot's journey is like a pilgrim's progress, but, unlike Christian, he is warned of the pitfalls before he sets out on his journey.

In the same way R.A.F. fighter pilots must be kept fully informed of the enemy's aircraft developments. When the new type comes into service details must be circulated without a moment's delay. Every fighter pilot must know the performance and maneuverability of the aircraft, and, if possible, what tactics the enemy is likely to employ in its use. If the British pilot is to be engaged in low-level attacks he must know where the ground defenses are and how to avoid them. The Intelligence Staff builds up this picture from photographic reconnaissance, from pilots' own reports, and other sources of information.

With vast forces deployed throughout the world, accurate and speedy information is essential if comprehensive plans are to be drawn up. On the Intelligence Staff of the R.A.F. lies the duty of evaluating and disseminating in an accurate and compressed form the gatherings from every conceivable source, and of placing them before the commanding officers for ready use in planning. The widespread disposition of R.A.F. squadrons throughout the world is a sufficient indication of the magnitude of the task.

Mobile Surgical Units

[From an article by Major P. B. Ascroft, Royal Army Medical Corps, in *The Army Medical Bulletin*, No. 65, January 1943.]

Major Ascroft was in command of one of a small number of mobile surgical units working in the forward areas throughout the Second Libyan Campaign which opened 18 November 1941. The following comments are taken from an article on his experiences in the Desert War.—THE EDITOR.

LOOKING BACK in the light of experience, what are the capabilities and limitations of mobile surgical units? How should they be constituted and what purposes may they fulfill? Certain basic principles may be laid down.

Flexibility: The mobile surgical unit should be so constituted as to be able to work efficiently at the base as well as in forward areas. In quiet times between battles there is more surgical work at the base than at the front (aftermath of previous battles; non-battle casualties, street accidents). If the personnel of mobile surgical units is concentrated always at the front, most of them will be unemployed.

Specialist Teams: Economy in personnel may be effected by equipping specialist teams for general surgery. In quiet times they can be employed on their own specialty, and in times of battle can be utilized as general teams in the forward areas as occasion demands.

Early Surgery: Mobile surgical units should be so disposed in the battle that casualties come to operation within eight hours (a modest enough ideal but difficult to achieve in desert warfare). This means that units must be capable of swift independent movement. It is more important to be able to pack up quickly than to be able to open quickly. The first warning of the approach of an enemy column may be a shell from approaching tanks. A light mobile surgical unit unable to get moving in fifteen minutes at the outside runs an unwarrantable risk of capture.

Efficient surgery: Nothing but the best is good enough for

the surgical treatment of patients in the forward areas. It is here, rather than at the base, that the fate of the wounded man is so often decided; whether he lives or dies; whether his limb is saved or lost; whether his wound remains clean and healthy or becomes infected and keeps him in hospital for months. By the time the patient reaches the base, the subsequent course of the injury is largely determined. The logical conclusion is that there is no room for makeshift surgery in the forward areas. Within the limits imposed by local conditions every effort should be made to operate with the same care as is exercised under normal circumstances.

Insistence on first-class surgery may seem at variance with the admitted crudeness of nursing facilities. But what are the real essentials of immediate postoperative treatment in nine out of ten battle casualties? They are food and drink, warmth and rest, and sulfonamide. These are provided. What is lacking? Soft beds, clean sheets and pajamas, a wash and brush up. It is not for a moment implied that these comforts are superfluous. But it is not practical to provide them in battle under desert conditions. There are, however, certain injuries that do suffer from lack of adequate nursing, especially abdominal, cranial, and spinal. Many of these travel badly after operation and are best held for some days. Yet so many of these injuries demand early operation. There is only one way out of the dilemma—rapid evacuation by air.

The one-table and the two-table teams: Two classes of mobile surgical units were used in the Western Desert, the single- and the double-table team. The single-table team worked either in a tent or in a specially fitted operating lorry (this is the type described below). The double-table team, such as our own, worked in a tent or pent-house erected in connection with a vehicle.

Experience suggests that there is need for both one-table and two-table units.

One-table unit with vehicle fitted as operating theater: This is an extremely mobile unit (able to get to work or to pack and move off in a matter of minutes), eminently suitable for "guerrilla surgery," i.e., it is a unit of limited capacity but capable of operating in very advanced positions, or with a mobile raiding column. To obtain extreme mobility it is necessary to operate within the vehicle, which must be suitably fitted. American gift units ("Greek," "Robin Line," etc.) epitomize this class and have saved many lives. One vehicle is fitted as an operating room with the operating table mounted in the center. A second vehicle is fitted as a sterilizing room. The chief disadvantage is lack of space in the operating vehicle.

Two-table unit with pent-house operating theater: Such a unit, running two tables concurrently, has greatly increased capacity but is somewhat less mobile. Theater accommodation is provided by a tent, or pent-house, erected round the vehicle. Pitching and striking this pent-house tent takes time, apparatus transported within the vehicle has to be set up within the pent-house, and it is found that forty-five to sixty minutes are required to start operating or to pack up and move off.

Personnel and operating capacity of one- and two-table units compared:

One-table super-mobile unit.

1 surgeon
1 anesthetist
1 general duty officer
4 other ranks
1 noncommissioned officer
1 operating room assistant
2 orderlies

Total 3 Medical Officers and
4 other ranks
Capacity: 10 operations per day.

Two-table mobile unit.

2 surgeons
1 anesthetist
1 general duty officer
5 other ranks
1 noncommissioned officer
(reception)
1 operating room assistant
3 orderlies

Total 4 Medical Officers and
5 other ranks
Capacity: 30 operations per day.

It is clear that when there are many casualties to be dealt with, it is more economical in men, material, and time to run a double team rather than two separate teams.

Selection of personnel: It is accepted that early adequate treatment of battle casualties will save life and limb and often prolonged convalescence on account of sepsis. The clinical course of an injury is usually determined by the treatment received in the forward areas, long before the casualty reaches the base. From the standpoint of the fighting strength or manpower of the Army it is even more important to treat the relatively slightly wounded man early and adequately than him whose life is in danger. A simple flesh wound may keep a man out of the line for months if it is allowed to go septic. If it is dealt with promptly and skilfully, the casualty is fit to fight in two or three weeks.

It follows that only skilled and experienced medical officers should be given the privilege and responsibility of manning mobile surgical units. Much of the work at the base, on the other hand, can readily be delegated to recently graduated medical officers, guided by a few experienced men. Once a casualty has reached the base he seldom requires much in the way of operative treatment. Dressings and re-applications of plasters and rehabilitation form the bulk of the work. Such operative work as is required usually takes the form of specialist procedures—orthopedic, plastic, etc. Much of the advisory work also is specialist—chest, eye, ear, central nervous system, urinary systems. Consequently, there need be no fear of draining the base of surgical talent.

With these points in mind, we may say that every member of a mobile surgical unit must be physically fit and able to undergo severe strain. No one should be over the age of 45. Surgeons should have at least five years' experience of general surgery, irrespective of any specialist experience. Anesthetists should have at least one year's special training. It is a dangerous fallacy to suppose that a rag and bottle in the hands of any medical officer temporarily unemployed is good enough. The anesthetist must be a sound doctor and capable of running two cases at a time. General duty officers should be graduated not less than three years and have one year's experience of general surgery. The general duty officer may have to take his turn at the operating table. The operating room assistant is a key man and must be specially chosen.

Automatic Dive Apparatus of the Stuka

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a German article by von Römer in *Deutsche Wehr* 24 December 1942.]

IT IS A WELL KNOWN FACT that in a dive very unusual demands are made on the plane as well as the crew. The forces operating on the plane and on the human body, which are dependent on the rate of acceleration or retardation, are often several times greater than the gravitational pull on the bodies which are in motion. We usually count on a man's being able to endure a strain of six G (pull of gravity—Ed.) without any untoward physiological effects. By proper training he may become able to endure a strain up to eight G. The greater the speed in the dive and the more quickly the plane is nosed up again after releasing the bomb, the greater will be the strains on both man and plane. The following article describes the constructional development of the Stuka and the scientific aids that are used today for the purpose of reducing the speed of the dive and for relieving the strain on the crew during the maneuvering of the plane.

The German *Luftwaffe* has the best dive bombers in the world. This type of plane was developed in a systematic manner. Graduate engineer Herman Pohlmann, the builder of the famous Ju 87 Stuka, was already engaged in the study of the dive bomber in 1931 and it was at that time with the

two-seater pursuit plane, the K 47 designed by him in 1928, that he made the first experimental studies of the necessary characteristics of the dive bomber, of aiming, and of bomb attachment and release. The K 47 can therefore be regarded as the forerunner of the modern Junkers dive bomber.

By means of our Stuka aircraft—which today includes the famous Junkers models, the Ju 87 and the Ju 88 (see Figure 1), and the Dornier Do 217—Germany was not only able to get an enormous start over the hostile powers but our Stukas have helped in the victorious decision of innumerable engagements throughout the entire course of the war by their most effective support of ground and naval forces.

In comparison with the serial release of bombs from horizontal flight, the release of bombs by dive bombers has important advantages. First of all, a bomb dropped in a dive can be much more accurately aimed. Important military targets, especially medium and small targets such as single bunkers, tanks, enemy ships, etc., are, therefore, most successfully attacked from the air by means of dive bombers.

In the construction of dive bombers a great number of difficult problems had to be solved. It was highly important in a dive to keep the speed within very definite limits in order to avoid overstraining both plane and crew. This was accomplished mainly by the employment of brake flaps. In the Ju 87 and Ju 88 the retractable and extendable brake flaps are located on the lower side of the wings (see Figure 1), while in the Do 217 another arrangement was adopted. Here the dive brake, which opens and closes after the manner of a parachute, is located at the end of the fuselage.

We are today in a position to inform our readers with regard to the so-called *Sturzflug-Automatic* (automatic dive control) of the Ju 87. By means of the dive brake, in connection with an automatic apparatus to pull the plane out of the dive and a safety piloting control, the bold attacks of our daring crews are rendered considerably easier. The diagram (Figure 2) shows clearly how the pilot, by means of a very few levers and knobs on the control box and "stick" starts the dive, releases the bomb, and finishes the dive. The opening of the brake flaps, the set of the auxiliary control surface, the release of the bomb, and the pull out of the dive take place automatically.

Before beginning the dive the pilot pulls back the throttle, closes the radiator shutters, and, if the type of plane he is flying has no automatic switch, he must set the lever at "Bodenlader." (This term is not understood—Ed.) If he has a propeller that is hand adjusted, this must be set at high pitch.

Shortly before going into the dive, the brake flaps are opened by an oil-filled hydraulic mechanism through the medium of a lever on the switch box which is attached on the left side-wall of the fuselage. For retracting the brake flaps the switch lever is set at "retract," which causes the flaps to be drawn back again by means of a hydraulic mechanism.

In order that the pilot may know at any moment what position his brake flaps are in, red indicators are located in the upper surface of both wings and are operated by the pistons of the retracting rod of the brake flaps. When the brake flaps are open these indicators protrude from the upper side of the wings, while when the brakes are retracted they are inside the wings and not visible.

When the dive brakes are opened, the automatic apparatus for pulling the plane out of the dive sets a trimming flap on the right elevator in such a way that the plane is nose-heavy and tends of itself to go over into a dive. As soon as the bombs are released the automatic apparatus again restores the trimming flap to its normal position. Now this causes the plane to be tail-heavy so that it tends of itself to level off. This action, therefore, introduces the maneuver in which the plane rises after reaching the point of maximum descent.

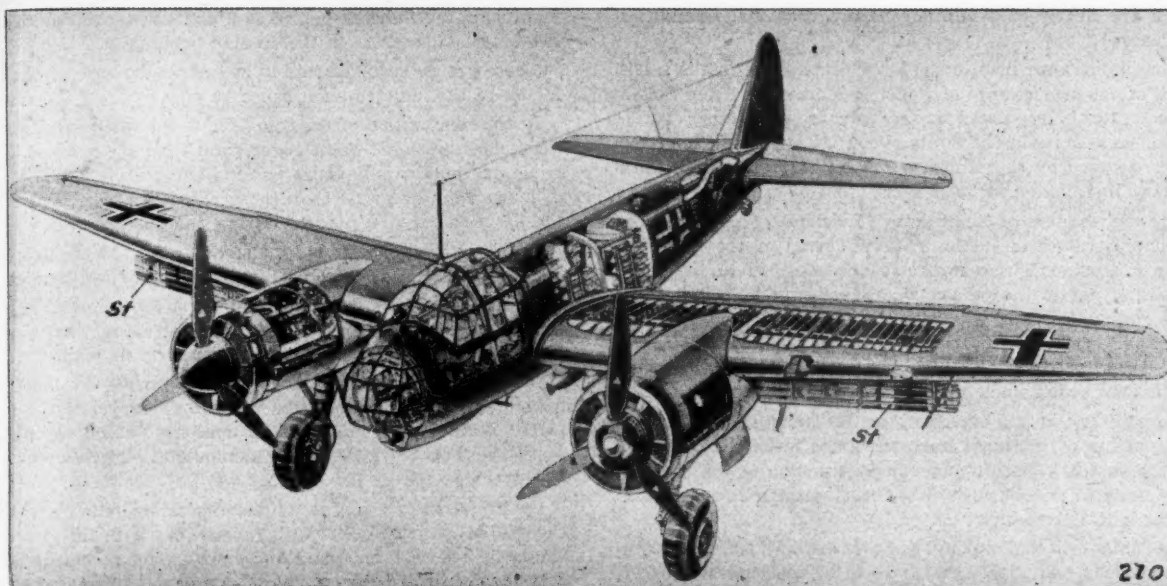


FIGURE 1.

The Junkers 88 Dive Bomber with Brake Flaps (St) in Braking Position.

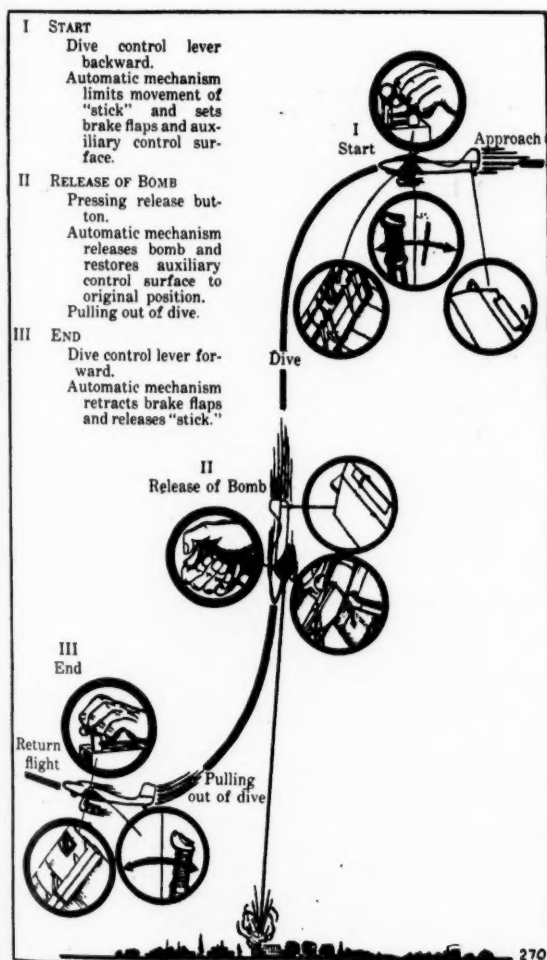


FIGURE 2.

A safety device which is "cut in" when the brake flaps are extended prevents, in a very simple manner, too sudden a turn of the machine upward from the dive. After the safety device is "cut in," the stick can be drawn back only five degrees from its normal position, giving the elevator but a slight tilt upward.

If, however, for some unusual reason it is necessary to pull out of the dive more suddenly, the stick can be pulled past the position in which it is held by the safety device by a pull of about 65 pounds.

When the dive brakes are retracted, both the automatic apparatus for pulling the plane out of the dive and the safety device for preventing too sudden a recovery are "cut in" and do not function.

After pulling out of the dive and retracting the brake flaps the pilot again opens the radiator shutters in order that the motor, which now has to work at maximum capacity while altitude is being recovered, will not become overheated.

From this description of the things the pilot has to do in making a dive even the layman may see how science, by the aid of cleverly devised apparatus, is effectively supporting the pilot in his flying task in order that he may be as free as possible of preoccupation and able to devote his main attention to the fulfillment of his mission.

Military Justice In the German Army

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a Spanish article in *Ejercito* January 1943, taken from *Hungarian Review*.]

THE FIELD OF ACTION of military justice in the German Army includes not only soldiers and the functionaries belonging to the army but also all in the area under the control of the army of operations, including prisoners of war and the native inhabitants regardless of citizenship even in a foreign country. In Germany itself, on the other hand, civilians fall under military jurisdiction only when the interest of

operations requires it or when they have committed crimes which are clearly of a military nature (espionage activities or treason).

Jurisdiction over men in the labor service and in the territories of the protectorate of Bohemia-Moravia and the Polish inspectorate is regulated in accordance with other rules. In Bohemia-Moravia the military court has jurisdiction over crimes covered by the Military Penal Code, while in Poland military jurisdiction includes every kind of crime.

The commanders of large units (divisions, corps) function as administrators of justice (*Gerichtsherr*) of the Supreme Army Command. These functions are attached to the command and not to the person who represents it, being exercised automatically by whatever person may succeed to the particular command. To be sure, the commanders of large units do not personally exercise the functions of a judge, but use judicial bodies made up of competent persons.

The military judges exercise their functions in the general headquarters of the large unit, while the instructing officers and the auxiliary disciplinary officers function in the various lower units in effecting the first investigations and carrying out the initial procedures.

The data collected during these investigations constitute the testimony and proofs that have to be used afterwards in the military courts. The instructing officer should be at least a captain, or, exceptionally, an older lieutenant, and in addition to this, one should be selected, if possible, who has a profound knowledge of the essence and spirit of the military service.

The military judges are responsible for their opinions as experts in their service activities; they serve as advisers to the commanders of the large units. When the commander does not accept the conclusion of the military judge, the latter is not obliged to subscribe to the commander's opinion. The commander designates among the military judges placed at his disposal, the one who is to assume charge of a given case. It is within his power to deal out justice directly in cases of misdemeanors involving a loss of personal liberty for a period not exceeding three months. Nevertheless, the man who has been sentenced may appeal this sentence, in which case the trial passes into the military courts.

The judiciary organs of the German army are:

- a. Field military courts.
- b. Auxiliary or extraordinary military courts.
- c. Reich military courts.

The field military court is made up by turns of the officers of the large unit selected by their chief. Its authority is that conferred on the commander in his capacity of administrator of justice, and it has charge of those cases which do not fall under the jurisdiction of the Reich military courts.

The auxiliary or extraordinary military court has the same powers as the field military court. Its composition is predicated on the urgent necessities and contingencies of war in cases where a commander of a large unit invested with the functions of administrator of justice is not immediately available. It may be appointed by a regiment or group commander who is obliged to submit a report of the whole proceedings and its results to the proper commander of the large unit who, in his turn, will have the trial examined by an expert from his headquarters. These courts can handle only those cases that do not require prolonged procedures and that arise when circumstances justify an immediate verdict.

The Reich courts handle the remaining cases, among which are found cases of *lèse majesté*, desertion, treason, the gravest cases involving the safety of the country, and offenses committed by general officers.

The field military court is composed of three members: a presiding official who directs the deliberations and who is generally a magistrate, and two judges appointed from lower

units. One of these must be an officer and the other an enlisted man or, if the indicted person is a civilian, the latter of the two may be chosen from the civilian population.

There are no requirements to be met in the case of the defender of the indicted man, hence he may be from the ranks.

In the composition of the court the usual rule prevails that the judges must not be of lower rank than the accused. The trials are public, only those persons being excluded who are of lower rank or grade than the accused. As a general rule, the accused must be present during the proceedings.

Witnesses and experts must also be present at the proceedings and be sworn. In case it is impossible for them to appear, their written declaration may be read.

The sentence is given by a majority of votes. The regulations prescribe no rules concerning the order of voting.

The sentence given by the court is confirmed by the commander of the large unit who reduces or suspends the sentence. Reduction of the sentence does not extend to capital punishment or imprisonment or to mandatory accessory penalties provided for by law.

Confirmation of a sentence involving capital punishment in the case of an army officer or a functionary with the grade of officer is reserved for the Führer who renders his decision after having heard the opinion of a military judge.

The death sentence, once confirmed, is immediately followed by shooting for men and decapitation for women. A request for clemency does not delay the execution of the sentence; nevertheless, in special cases the accused may be pardoned by the commander of the large unit.

Overcoming Antitank and Anti-Infantry Obstacles

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a Russian article by Lieutenant Colonel of the Guard S. Fokin, Soviet Army, in *Krasnaya Zvezda* 17 December 1942.]

ON THE APPROACHES to their defensive positions the Germans usually construct barriers in which explosives are placed. Advancing toward the hostile positions, our attacking units almost always discover minefields and various booby traps of pressure and pull action. The Germans customarily integrate explosive obstacles with the other systems of anti-tank and anti-infantry obstructions. For this reason we place very great stress on engineer reconnaissance when preparing for an attack. Groups of sappers are sent out the night before on the approaches to the hostile centers of resistance. They determine the location of minefields and proceed to render them ineffective.

The clearing of passages in minefields is a complicated matter. It is not possible to solve the problem by a single standard method. The engineer commander will be able to provide an unhindered advance for the troops only if he fulfills the task intelligently, with consideration of all the details of the complex situation. It must be remembered that the enemy never leaves his minefields to the whims of chance. He keeps them under observation, and carefully covers them with artillery, mortar, and machine-gun fire. In setting up surprise mines, the enemy always tries to lay a new snare for the attackers. Commanders Kalinin, Nazarov, and Kolyayev of guard sapper units, engaged in securing the attack action of our troops in the region of Vladikavkaz, are able to answer the cunning of the enemy with cunning of their own.

A certain inhabited place was being fought for. In order to bring up attack units to the forward edge of hostile defense, all that was necessary, at first glance, was to clear two or three passages through the minefields. The guard sappers acted differently. They decided to clear dozens of passages.

The amount of labor was increased several times, but the expenditure of energy was repaid with interest in the course of the battle. Having cleared many passages, the sappers upset the plans of the enemy and concealed the actual direction whence the attackers were intending to inflict the blow on the hostile defense.

To be sure, the sapper units did not always succeed completely in effecting the plan of mass construction of passages in the minefields. Sometimes they were harassed by the hitherto unavoidable deficiencies in cooperation between sapper reconnaissance parties and fire elements which were to cover the work of disarming the minefields. The fact is that some commanders of forces of all arms did not take into consideration the scale of the work to be done. They thought that a few machine guns would suffice to protect the sappers. But the enemy, detecting activity in front of his position in the night, immediately put his artillery and mortars into action. The heavy machine guns, moved up for the protection of the sappers, could not, of course, silence the hostile artillery which entered the combat, while our batteries were late in opening fire. As a result the tempo of clearing the minefields slowed down, and at several places the passages were not ready on time.

The fighting in the region southeast of Nalchik disclosed one basic deficiency in the cooperation between the sappers and the infantry. Some of the infantry officers were little concerned with the maintenance of ready passages up to the moment when the troops went over to the offensive. The companies and battalions did not take over from the sappers the passages already cleared and did not set up guards of automatic riflemen and machine gunners over them; thus the Germans laid new mines in the cleared areas without any opposition.

In the course of the battles the command of the sapper and infantry units realized these deficiencies, and in consequence the cooperation of sappers with infantry and artillery bore a more precise and better organized character.

The combat activity of sappers in an attack is not limited to reconnaissance of minefields and construction of passages. As the troops advance, we detail special sapper groups which are to lead battalions, companies, and squads through the passages made the night before in the minefields. It is necessary to guide the infantry units because the Germans try to reestablish the disrupted mine obstructions by every means. When sappers are among the attacking infantry, it is easier to detect explosives replaced by the enemy and render them ineffective.

In recent battles in the Northern Caucasus, sapper groups accompanying tanks have likewise done great work. The sappers led our combat vehicles across minefields, acted as markers, and helped the tank crews evacuate damaged vehicles from the field of battle. A third group of sappers accompanied the artillery. They carefully examined every new area of artillery positions, cleared them of traps set by the enemy, and laid out their own minefields to protect the weapons. After the advance units of infantry and tanks we sent out new groups of sappers who widened the passages and also cleared the mines from the areas along the roads and in inhabited places.

Engineer support of offensive combat was accomplished by specially detailed mobile sapper reserves. This group carried on an extremely large and varied activity every day. Once, in the region southeast of Nalchik, the Germans were preparing a tank counterattack. A group of sappers, in reserve at the time, was immediately shifted to the place where the breakthrough by the German tanks was intended. The sappers, functioning in conjunction with armored vehicles and artillery, quickly constructed a minefield in the bushes and grass. The path of the hostile tanks was blocked and several machines were blown up by our mines.

The mobile reserve group of the sapper unit commanded by Kalinin displayed itself to particular advantage in the fighting for inhabited places on the approaches to Vladikavkaz by clearing streets and buildings of various booby traps. On their departure the Germans mined articles of everyday use, making booby traps of stools, buckets, and even pieces of bread and hens' eggs. In one inhabited place our sappers found sixty such traps, thus saving the lives of at least eighty Red Army soldiers.

In recent battles the sappers of a certain guard unit showed great examples of heroism, fearlessness, and exemplary performance of combat tasks. On the minefields laid by Kalinin's unit, up to twenty German tanks, seven armored vehicles, and seven trucks were blown up. The sappers led by Nazarov more than once penetrated to the enemy rear and set up explosive obstacles on the routes of retreat, destroying ten German motor vehicles. The sapper groups under the command of Major Kolupayev removed up to 500 mines from hostile minefields in a short time, placing them in localities where the development of German counterattacks with tanks and infantry appeared probable. These mines, directed against their former masters by the skilled hands of the sappers, served their purpose and many Hitlerite soldiers and officers were killed by them.

The Struggle for Lines of Communications in Winter

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a Russian article by Major P. Slesarev, Soviet Army, in *Krasnaya Zvezda* 17 December 1942.]

THE OFFENSIVE BATTLES in the region of Velikiye Luki and Rzhev have once more demonstrated the great importance of railroads and highways for military operations. In the winter even the machines with caterpillar treads, up to light and medium tanks, are restricted to highway routes, not to mention wheeled transport by the aid of which the Germans effect more or less important regroupings of infantry and artillery units. Great congestion of troop columns on a few roads inevitably leads to obstructions and increases the difficulties of planning and executing any maneuver, even a simple one.

To cut the enemy's communications is to deprive him of the possibility of using his reserves for counterthrusts on the most important sectors of the front. The German groupings become disorganized and their leadership collapses, which facilitates their destruction in detail. There are various methods for disrupting enemy communications. They depend on the number of troops and weapons for preventing approach to their lines of communications. Let us examine some of the most effective of these methods.

The Germans begin the defense of railroads and highways at the remote approaches to them. As a rule, the first line of anti-infantry obstacles (wire entanglements covered by the fire of light machine guns and pairs of automatic riflemen) is set up parallel to the routes and as far as ten to fifteen kilometers from them. Within two or three kilometers a loose network of dugouts is usually set up; they are situated mainly at road intersections and on the outskirts of villages and settlements. Both these lines are intended only to ward off surprise infantry attacks. The aim of their resistance is to break up the attacking formations, to sap the strength of the attack by means of strong automatic-rifle fire before it approaches the main defense line.

The main defensive line consists of two or three series of dugouts and artillery batteries concealed from ground and air observation. Here all the inhabited places are organized in an all-around defensive system. They are connected by

telephone with the front and the rear, and each is furnished with one or two radios for use in case it is encircled. How great a role command by radio plays in the German system of defense is witnessed by the fact that, cutting across four highways leading from Velikiye Luki to the northwest, our units in two days of fighting captured 14 radio sets in enemy bases.

The strong defense zone begins as far as five to seven kilometers from the main roads. It is fortified by minefields, antitank ditches, and other engineer obstacles. The great number and density of artillery elements is a serious obstacle for tank maneuver.

Our troops had to overcome just such a zone in the battles for the Velikiye Luki-Novosokolniki railroad. After a thorough artillery bombardment of the hostile positions our infantry and tanks moved forward. They easily took the firing positions of the outer defensive area and in some places wedged themselves into the main German defense zone consisting of numerous dugouts and artillery batteries. But further advance to the south was blocked. Our tanks, acting in separate groups on a wide front, could not break through to the railroad. Only at one place did the attackers achieve great success, and even there they were separated from the railroad by a strip of land about two kilometers in width.

Soberly weighing the circumstances, our command borrowed a number of tank units from the neighboring forces and, gathering the tanks in a powerful group, moved them to the place where the success had been won. Toward evening the tanks attacked in three echelons, broke through the last chain of dugouts, and together with units of automatic riflemen straddled the railroad.

Darkness fell and it seemed possible to take a rest as the objective had been more or less attained. However, the command did not cease developing the success, and this was proper in the situation. A part of the tank and infantry units, widening the wedge which had been driven in, attacked the nearest enemy positions on the right and left. Into the resulting breach poured antitank guns, which supported the efforts of the infantry and tanks by fire and maneuver. At the same time a large group of heavy and medium tanks together with squads of automatic riflemen and ski troops struck along the railway roadbed, moving in the rear of the main German defense zone. This maneuver of the tanks, which forced the Germans to fight with a reversed front, dissipated the enemy strength, cut them off from the rear, and broke their will to resist. Progressing along the railroad some four or five kilometers, the tanks halted, occupying some adjacent farmsteads and buildings under the protection of the infantry. Not knowing where to expect another blow, the Germans continued disorganized fire in all directions throughout the night.

In the morning the activity of our troops increased. The units attacking frontally succeeded in three places in penetrating the defense zone protecting the railroad from the north. Here one attack group of infantry and tanks approached the railroad not far from Novosokolniki. In case of success, it could unite with the other tank group, and the whole German grouping would be surrounded with an iron ring. The threat of encirclement was real, and the Germans, firing fiercely and occasionally counterattacking, began to retreat toward Novosokolniki. During the day, the whole defensive zone was cleared of the enemy, and the garrison at Velikiye Luki was cut off from the west and northwest. On the field the Germans left more than one thousand dead soldiers and officers, eighteen tanks and armored machines, 74 guns of various caliber, about ninety mortars, and many rifles and automatic rifles. More than 130 dugouts were destroyed.

The successful capture of the important railroad and highways was accomplished by the rapidity of action and

the carefully planned maneuver of tanks and infantry. It calls for a number of tactical conclusions. In order to deprive the enemy of one or several important lines of communications, it is necessary to conduct an attack simultaneously with several groups on a wide front. This permits involving the whole enemy firing system, and compels him to commit the main mass of his reserve forces. If success is observed at any spot, it must be developed immediately even at the expense of weakening the effort on adjacent sections. Having reached the designated lines of communications, it is very important not to stop, but to move on farther without a pause in order to break up the enemy's rear and the approaching reinforcements. Only after the enemy has been thrown back at least to the distance of aimed mortar and machine-gun fire, and his closest centers of resistance have become involved in fighting flanking groups of our tanks and infantry, is it possible to consider that the first stage of the seizure of communications has been accomplished.

The consolidation of the success must consist in the reduction of the enemy's encircled defense position to a number of separate sectors, and the annihilation of their garrisons by means of joint action of all types of troops. Bold action by tank units and ski detachments in the rear of the enemy's defense are of decisive significance during this stage of the battle. Such mobile attack groups can break up any counter-maneuver of the enemy, as recent combat experience has shown. They must break through boldly to the nearest road junctions and break up the hostile motorized columns within a radius of thirty to forty kilometers from the place of the decisive engagement.

In the foregoing we have analyzed the separate stages of the battle for the enemy's lines of communications, as a result of which our troops first straddled them at one point and then occupied the highways and railroad for a distance of fourteen kilometers. However, the enemy resistance sometimes is so energetic, and the number of his fire elements in the immediate vicinity of the roads so great, that immense effort is needed to overcome his defense. In such cases it is much more profitable to block off his communications with artillery and machine-gun fire, moving observation posts close up to them.

On a certain section of the front west of Rzhev a unit was engaged in offensive combat with the mission of cutting a highway along which the enemy was constantly shifting troops and supplies from west to east and back again. But when the attacking units were still four or five kilometers from the highway they encountered a network of fortifications. Despite the desperate resistance of the enemy our units approached two inhabited places, which turned out to be powerful centers of resistance. Here the troops stopped, dug in, organized all-around defense, and disposed and skilfully camouflaged antitank guns and rifles.

During the day the Germans, holding a grove on the flank of our units, counterattacked five times, throwing into the battle not less than a battalion of automatic weapons and from ten to twenty-eight tanks. The Hitlerites left seven tanks and more than 400 dead on the battlefield the first day. Nevertheless, they renewed their activity the next morning. Conscious of the danger that our units would reach the only road connecting their large grouping with Rzhev, they spared neither personnel nor matériel. But the wedge driven into the German defense remained solidly where it was.

Toward noon it became evident to the commander of our units that it would be possible to move forward only after capture of the grove. Having assigned sufficient covering force to the inhabited places and having inconspicuously gathered his units into an offensive group, he attacked the grove from the flank. This attack was supported from the front and the grove was soon successfully cleared of the enemy. Moreover, the attacking units, having by-passed the

two adjacent villages, attacked them unexpectedly from the rear and captured them. Thanks to this, the unit reached elevated ground from which a considerable section of the highway could be observed. Consolidating this position and organizing a network of observation posts, the unit began to bombard the road. Movement along the highway was now possible only at great risk, and even then only at night. As soon as the sound of motors was heard, the artillerymen opened previously adjusted fire. Now the road no longer had great tactical importance, and the Germans were forced to adapt the nearest country roads to the movement of wheeled transport. This greatly limited the maneuverability of their motorized columns. In effect the grouping of the enemy was now half encircled. In order to prevent the final closing of the ring, the Germans threw great masses of tanks and infantry from adjacent sectors of the front into counterattacks.

As mentioned above, the enemy tries to use country roads when half encircled. During storms and snowfalls these roads are often choked with drifts and become impassable. Thus at one place west of Rzhev a stoppage of German wheeled vehicles began as a result of snowdrifts. Our air reconnaissance discovered this in the late afternoon. In the morning our bombers, dive bombers, and attack planes took to the air. With consecutive powerful blows they destroyed and burned in one day nine tanks, 229 trucks with troops and supplies, eighteen guns, and other matériel at the places of congestion. In the following days our air forces, supporting the ground troops, just as actively broke up the movement of enemy supply and the maneuvers of his motorized columns.

In this way the successful battle for communications finally led to encirclement and semi-encirclement of hostile groups and units. Then the struggle for lines of communications shifted from land to air. The Germans, trying to support their troops, brought transport aviation into action. Trimotored Ju-52's, singly and in groups, appeared above the enemy garrisons and units which were in a difficult situation and dropped packages with munitions and provisions. ME-109 fighters usually protected their activity. Our air patrols, constantly covering these sections of the locality, successfully attacked the German transport aviation.

Tactical Employment of Antitank Rifles

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from an article by Major V. Smirnov, Red Army, in *Krasnaya Zvezda* 11 July 1942.]

AMONG the effective means of combat against hostile tanks the antitank rifle occupies a high place. A small rifle in the hands of skilled men literally performs miracles. The lightness, portability, and quick-fire operation of the antitank rifle permit its crew to prepare for battle in a few seconds and to protect infantry and other units on the march, in battle, and at rest.

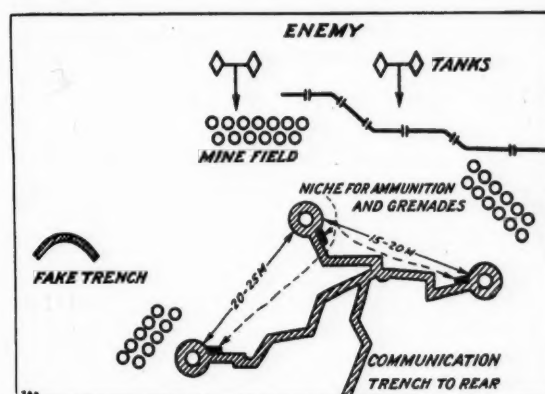
An artillery battery was proceeding in a marching column. Suddenly six hostile tanks rushed against it. A soldier named Vasilyev armed with an antitank rifle saved the situation. He immediately leaped from a trailer, lay down behind a hillock, and began to fire at the attacking tanks. He hit the leading machine and the other Fascist vehicles hesitated, but not for long. The whole battery managed to unlimber, deploy, and open fire on the enemy. The sudden attack was repulsed. Of the six German tanks, four were disabled.

Generalizing the wide experience gained by units of antitank rifles in the recent fighting, let us draw a few funda-

mental principles of their tactical use. Experience has shown that some commanders display little preoccupation with or initiative in this matter and underestimate the power of their weapon. The most frequently encountered deficiencies may be reduced to the following: a tendency to disperse the rifles, dependence on single rifle fire, concealment of firing positions in dugouts, and weakness of fire coordination with other elements of antitank defense.

Battle experience indicates above all else that dispersion of detachments of antitank rifles is disadvantageous. Two or three guns disposed fifteen to twenty meters apart constitute the basic combat unit. Such a combat formation permits the concentration of grouped fire on a single target, which is very important. As a rule, the knocking out of even a single tank with the first round causes confusion in the ranks of the attackers and increases the confidence of the riflemen in the strength of their weapons. The probability of striking the target with grouped fire is of course much greater than with individual fire.

And also, when hostile machines approach any one of the rifles, the others can help their neighbor opportunely with the more effective flanking fire. Hence another conclusion:



the guns should be deployed at intervals, forward or backward (see sketch). The commander of the detachment is located where he can best observe the enemy and direct his men.

With a sufficient quantity of rifles it is more advantageous to dispose the squads at distances which permit their commanders to direct the fire effectively. The rifles assigned to an artillery battery should be placed near one another on the more dangerous flank of the battery firing position. Of course in the disposition of the antitank guns the primary consideration is the relief of the terrain and the direction of greatest danger.

A map is helpful only in establishing the general plan of the defense: details must necessarily be adjusted on the terrain. Once we observed the following situation: From a trench, where the crew of an antitank rifle took up position, there was a forward view of only fifty meters. Vision beyond was cut off by the embankment of a deep ditch. In the opinion of the senior commander, who was familiar with the area only from a map, the embankment should not have hindered firing. As a matter of fact a hostile tank would be noticed only when it had appeared right in the firing position.

Another important question is the organization of the firing position. In many units a veritable mania for dugouts prevails, that is, a tendency to get the crew under a wooden shelter by all means. There results only an appearance of greater safety of personnel, as has been convincingly shown in recent fighting. The fact is that a roof of only one or two layers with embrasures reveals the position, and the surface of the dugout only increases the probability of a direct hit by aerial bombs or shells. Observation and fire from em-

brasures is reduced and an all-around field of fire is impossible.

The attempt to compensate for the latter disadvantage by the fortification of small areas outside the dugout has not been successful. To take up position in such an area upon the approach of a tank from a visible sector means to lose valuable time. And it is not easy to move rapidly along communication trenches with a long rifle. Combat has proved that all-around field of fire and stability of rifle crews is best secured by narrow trenches with small circular emplacements (see sketch). Here the trenches are constructed without breastworks, but the earth thrown out in digging is used for the construction of fake works on the sides.

Trenches similar to the ones described are almost completely invisible from tanks even when they are nearby. They are uniformly useful for firing with an all-around fire and afford protection from splinters in any intensive bombardment from land or air. There were many occasions when our troops took shelter in the trenches during aerial bombardment; but no sooner did the tanks move out, than our troops immediately prepared for battle and took up fire. Even if a machine should come right up close it can do nothing. If it passes over the trench, the antitank riflemen can easily strike it in a vulnerable spot.

In conclusion a word must be said as to preparation and conduct of fire. In this matter there is practically only one consideration; every rifleman will select five or six orientation points in the terrain, measure the distance to them, and study the ground over which the enemy may attack. Of course, the choice of orienting points will not be confined to distant lines.

The universal sight simplifies technique of aiming: for firing at a distance of less than 400 meters it is unnecessary to take a lead. It is necessary only to pick out carefully and calmly the most vulnerable part of the tanks, to take advantage of every halt, delay, or turn in order to hit point-blank with certainty.

The commander organizing antitank defense must provide protection for the antitank rifles with all sorts of obstacles, as well as with fire by other elements.

Glider Training As a Preliminary to Air Service.

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a German article in *Wissen und Wehr* November 1942.]

FOR A LONG time now the glider has had no need of struggling for attention. For years it has shown that its existence is justified in the preliminary training for the air service, and today all in a position to know agree that glider pilots constitute a great reservoir from which air combat forces may be drawn. The importance of the glider in this respect is still greater in time of war when in many countries the need for conserving gasoline supplies makes the use of motorless planes especially desirable in the preliminary training of future pilots. The experience not alone of Germany but also of her allies and even of enemy countries has proved beyond any doubt that the period of training can be reduced in this way from one-third to one-half without any danger of lowering proficiency. Quite on the contrary, the youths who have been trained in glider operation often require less than the prescribed minimum training time to say nothing of the theoretical and practical knowledge and the mental qualities they bring with them which result in fewer eliminations for lack of fitness for flying.

Glider training is given the greatest attention in the country where motorless flight had its birth. The National Socialist

Flying Corps, an aeronautical combat organization responsible to the Führer for the training of future fliers, has at its disposal in its "Landesgruppen," "Standarten," and "Stürme" an organization which is unique of its kind and covers all of Greater Germany. In the high ranges of mountains, on the wooded slopes of the lower ranges, and even in the lowlands, among the dunes and on the steep shores of the ocean, are to be seen hundreds of glider fields and dozens of glider schools in year-round operation. Today glider operation is an indispensable training stage in the development of every future flier. Even before they are taken into the aeronautical branch of the Hitler Youth Organization, German youth are enrolled at the age of twelve in a model-building society where they learn the fundamentals of flying which they will require later in building and flying gliders. Then when they are finished fliers, the National Socialist Flying Corps releases them for service with the Air Forces.

All of our people know that glider pilots can fly hundreds of kilometers across country without motors and, by plunging boldly into thunderheads, may climb to heights of six to eight thousand meters (20,000 to 26,500 feet) and circle for two days and nights in steadily rising air currents.

These records reveal the high standard of accomplishment of the glider movement in which 3,000 honorary glider instructors were engaged during the year 1939 alone. The steady increase in the number of examinations passed and in the number of flights made is shown in the following tables:

Years	Glider Examinations	Flights
1937	17,929	778,999
1938	24,862	1,043,887
1939	40,269	1,507,763

While in the year 1930 the average age of the pupils was 25, by the year 1939 it had dropped to 16 or 17 and experience gained in German glider flights shows that training for glider flight may be successfully begun at 15 years of age.

In accordance with a decree by the Reichminister of Aeronautics and the Commander in Chief of the Air Forces, there were glider-flight groups established even before the beginning of the war, one of whose main purposes was to provide an opportunity for flight and service training for the non-flying personnel.

In Fascist Italy the first suggestions for picking men as future fliers by means of preliminary training in glider flight, came from the then Minister of Aeronautics, General Balbo, who in 1927 instituted the Pavullo Glider School in the Modena Apennines. The Royal Central School of Glider Flight (Reale Scuola Centrale di volo senza motori) which resulted from it was the first of its kind. Here hundreds were trained and housed free of cost. Since its establishment it has been conducted by competent officers of the air force. If physically fit, *Avanguardisti* (members of the Juvenile Fascist Organization, aged from 12 to 18 years), college students, or members of the Italian Aero Club are admitted.

In Japan, the same as in Germany and in Italy, glider flight forms the basis of all further aeronautical activity. With the help of the Ministry of Education, all college and secondary schools contain glider units. Since the Spring of 1942 glider training has even been compulsory in the three upper classes of the secondary schools. Even the members of the air forces engage in glider flight. Before the war, in Japan there were 70 and in Manchukuo 7 centers for practice in glider flight. Three schools are in operation throughout the entire year.

The Soviet Union has been giving the greatest attention to glider flight since 1923. For nearly two decades it has given intelligent attention to glider flight from the point of view of air preparedness and, even though any statements made by the Soviets must be regarded as influenced by propagandistic tendencies, we must not fail to take account of the fact that the USSR owes her large figures relative to flying personnel and parachute troops after all to the wide-spread practice of

glider flight. Among other things, parachute jumping is one of the requirements for a glider license. The "Ossoaviakhim," the central Soviet Russian air sports organization, has of late lost a large part of its training centers, especially the College of Glider Operation at Koktebel on the Crimean peninsula.

Also in England and the USA an interest was started shortly before the war in glider flight as a government controlled method of training.

In England they at first set about, in an earnest, cooperative, government program, getting 700 cadets belonging to the Air Defense Corps between the ages of 14 and 18 years into 14-day camps in various parts of the country where there were flying clubs under the supervision of the parent organization, the British Gliding Club. According to reports, the units of the Air Training Corps (a formation of future flying personnel) are receiving training in glider operation in a school located in the northeastern part of England. Even in the Imperial Training Program glider flight has gained access. A first attempt in this direction is being made at the present time in India where the future airplane pilots are first being trained in motorless flight in American planes of the Bowlus type.

In China also, those desiring to train as fliers with Chiang-Kai-Shek's air combat forces must first take this training.

In Australia and South Africa, there exist glider organizations supported by the government; in South Africa, part of them are even made up of men belonging to the air service.

Construction Troops at Sevastopol

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a German article in *Militär-Wochenblatt* 4 December 1942.]

The description of the construction operations given below follows the accepted American conception of such operations if one substitutes "Engineer General Service Regiments and Engineer Separate Battalions assigned to theater troops" for "Organization Todt," the semi-military construction organization that supports the German Army.

The operation described shows Engineer reconnaissances well forward, the use of Combat Engineers in removing mines and other obstacles, in stream crossing operations, the strengthening of bridges to receive military loads, and road work of a pioneer nature to accommodate wheeled transport. It indicates that each echelon took care of its own needs and transferred the maintenance and improvement problem of communications to the next higher military echelon as the advance progressed until finally the responsibility was assumed by theater troops, in this case, the Organization Todt.—THE EDITOR.

THE SIGNIFICANCE of the strong, if not the strongest of the Soviet sea and land fortresses, Sevastopol, which surrendered on July 1, 1942 to the German land attack after a stubborn twenty-five day struggle and the part played by the various arms of the service in this glorious feat have already been given their due place.

In the following article a short description will be given of the work of the construction troops in the preparations for and execution of the attack on the fortress.

For carrying out the many types of construction tasks which were necessarily connected with the execution of the attack, on account of the nature of the terrain and the unfavorable weather conditions, the attacking army had at its disposal, under the command of a higher construction staff and commanders, the following construction formations; one and a half bridge building battalions, one road building battalion,

one construction battalion and three fortification construction companies.

Since November 1941 the movement of supplies to the front had been confined to but three routes. One lateral road existed but this was rapidly losing its value as the advance progressed. There was a definite need for a large scale road building program. This was initially based on map and aerial photograph reconnaissance, later on through geological and technical considerations. The three existing routes had to be extended as the advance continued and a new lateral, well to the front, had to be constructed after the winter fighting had secured the desired terrain. In addition, numerous secondary or pioneer roads had to be made available for the immediate supply of front line troops. In general, Corps troops, governed by tactical considerations, made the roads usable until Army troops could assume the responsibility for major repair and reconstruction and for new construction indicated by operational considerations.

During the six month period ending late in May 1942, about 65 miles of highway were secured and had to be restored to a usable condition. These had either been two-way roads or one-way roads with passing places. This work was accomplished under adverse weather conditions and frequently under artillery or mortar fire as well as guerrilla attacks. In addition, 54 miles of roads were widened, 100 miles received major maintenance and 42 miles were maintained. The problem of restoring the main highways to usefulness involved much labor as the Russians had defended them stubbornly. This required the removal of barricades, the filling of shell and bomb craters, and the removal of a large number of mines. All of this work was turned over to the Organization Todt as the corps moved on ahead.

Bridges received considerable attention along with the highways. Weak structures had to be strengthened, destroyed ones replaced, and many had to be widened for two-way traffic as the roads leading to them were widened. Although the amount of destruction was less than had been expected, twelve bridges totalling almost 700 feet in length had to be replaced and two totalling about 115 feet in length had to be reinforced. The bridge work required the felling of 5,000 trees in local forests, their processing through two saw mills, and the handling of the resulting 1,000 truck loads of bridge timber from the mill to the various construction sites.

Engineer reconnaissance units were well forward at all times. Small detachments followed closely to remove the mines of all types which the Russians used extensively at stream crossings and along the highways. More than 4,000 mines were removed by these detachments prior to the arrival of construction equipment.

Three crossings were effected in a very short time over the Belbek which was at a low stage. A 22-ton bridge was erected at the first crossing in fourteen hours in spite of interruption by artillery fire. The second crossing required twenty-two hours for a 16-ton bridge almost 100 feet in length. The third crossing was rather unusual. Here the crossing was completed by a bridge battalion on the day that the site was seized. This battalion lacking floating equipment used prefabricated trestles and completed the job in six hours. Thus the construction troops kept pace with the movement of the troops as the fortress was approached. The movement of medium and heavy artillery was provided for as well as the smooth functioning of the supply services.

The progress made in this field in modern warfare is shown in an exemplary manner by means of a comparison with the eleven-months' siege of Sevastopol in 1854 and 1855, by the French-English Army of the Orient. While, at that time, the progress of the attack, especially during the first half of the time of the siege as a result of the inadequacy of the attacking means, and as a result of the difficulty of getting guns and ammunition into position at the proper time over the bottomless roads, was continually coming to a halt, the Ger-

man command of the present day possesses, in addition to the engineers, who often have a part in the combat operations, a technical auxiliary arm in the construction troops which with their tireless labors, prepare the routes to the front for the other arms, and in this way contribute materially to the shortening of the attack operations.

The Attack Across the Don Northwest of Kalatsch

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a German article by Selle in "Vierteljahreshefte für Pioniere," issue No. 4, 1942.]

THE ENCIRCLEMENT OPERATION in the areas west of Kalatsch, which ended with the destruction of the main body of the 1st and 62nd Tank Armies, was over. With the ending of this battle the terrain in the great bend of the Don was virtually cleaned up. The army of General Paulus of the tank troops mopped up the near shore northwest of Kalatsch then, along with the divisions under R. and W., under the command of the corps general staff under S. began preparing in the sector of the Don on both sides of Wertjatschij for the attack across the river. To the north, there was already another army corps fighting for the control of the Don. This corps succeeded in forming two small bridgeheads and not only in holding them but strengthening them in the face of strong command of S. was first to form a larger bridgehead from which tanks and fast troops all ready for action were to plunge on toward the east. In view of the enemy situation, it was ordered to carry out the operations with the greatest speed possible. Since strong forces of engineers with carefully measured bridge equipment were stationed in readiness for action, the Army High Command decided to entrust the army engineer commander with the command of the troops in crossing the river. The latter was put in command of all available engineer units on 16 August 1942. These included: three engineer regiment staffs, five engineer battalions, one assault boat unit with 81 boats, one bridge-building battalion, one road-building battalion, two bridge train detachment staffs, and the 181½-ton bridge column under B.

It was planned to build two 20-ton ponton bridges. It was quite uncertain whether or not the equipment on hand would be sufficient with the river from 220 to 250 yards in width, especially since the columns were short of material, and during the assembly one bridge train had had to be turned over to a division which was soon to cross the river at Kalatsch. Since, however, the shallow margin of the river would presumably make possible the employment of a considerable amount of trestle gears, the construction of two 20-ton bridges could be counted on. The only uncertainty was whether or not the shallow water would permit the use of ponton ferries.

Since the attack was to begin on 19 August and there was not much time left, all warning orders also were given from the Army High Command concerning the initial assembly. The final orders regarding organization were given out after a conference with the corps general staff under S. and the commander of the engineer regiments at 11:00 AM on 17 August at the corps C.P. where the army engineer commander had gone. In conformity with the decisions the following

units were placed under the division commanded by R., which was the division occupying the strong-point on the left.

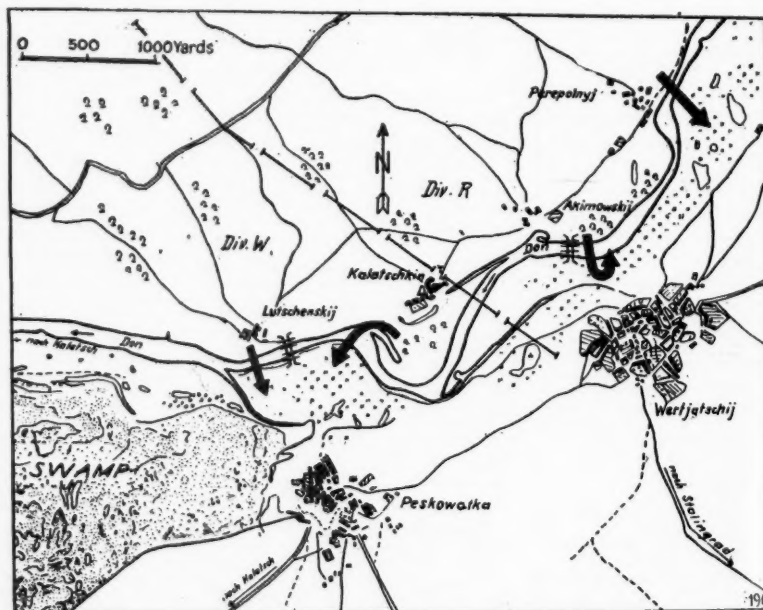
The staff of the engineer regiment under the command of Sch., the leader for the engineers, was as follows: the motorized engineer battalion under Le., the engineer battalion under Pr., the assault boat commando under Pe. less 1 platoon (54 boats), the staff of the bridge train under command of Ro., nine and a half type "B" bridge trains, and a road-building battalion under Fr.

Under the division on the right were placed the staff of the engineer regiment under H. as leader of the engineer units, the motorized engineer battalion under Bu., the motorized engineer battalion under Pa., one-third of the assault boat unit under Pe. (27 boats), the staff of the bridge column detachment under Bo., and eight type "B" bridge columns.

In addition to this, of course, the division engineer battalions were available.

As reserves for the army engineer commander who on 18 August took over the duties of engineer commander with the corps under S. there were available the engineer regiment staff headed by V, the engineer battalion under Li., the bridge-building battalion under Cz., and one type "B" bridge train (this had to be given up on 20 August).

The fact that this left the corps with no reserves was intolerable from the conventional point of view, but had to be accepted along with the rest of the situation as the columns which had been assigned to the division would certainly be employed.



The forces held in reserve by the corps were brought close to the Don and made ready in such a way that they could immediately set off for the area occupied by either division.

In the afternoon an order arrived concerning a forty-eight hour postponement of the attack, since the assembly and supplying of the artillery with ammunition did not permit an earlier start. Even though it was possible by rushing matters to get the engineers ready by the evening of 18 August yet the postponement was very welcome for the paramount purpose of carrying out the large amount of terrain reconnaissance. The many balkas (draws) filled with oak trees and shrubbery offered the enemy units sufficient room for concealed preparation. Only the water supply was very hard to take care of on account of the character of the country.

In the sectors of both divisions, two infantry regiments were provided for service in the front lines. Accordingly,

during the night between 17 and 18 August, four places altogether were found suitable as crossing sites and the roads leading to them and assembly areas in the vicinity of the river were decided on and marked. In the attack sector of the division, at the strong point, the terrain conditions along the Don were favorable because a low grassy rise ran along the near shore and provided an assembly area protected both from the sight of the enemy and from his fire. The assembly routes all led over the barren slope leading down to the Don, and were a little over half a mile in length. With the division on the right the situation was just the reverse. On this account the preparations of personnel and equipment were entirely different in the two attack sectors, but concerning this nothing further will be stated in this article. In the sector occupied by the division under W., two engineer officers had succeeded, under weak fire from the enemy, in swimming across the Don during one of the nights and in coming back with the approximate profile of the river. Possible bridge sites were investigated just a little way upstream from the Russian ferry site at Akimowskij and at the east entrance of Lutschenskij.

After dark on 20 August assault boats and large pneumatic rafts were carried to the starting point by men from the infantry, and preparations were made for the construction of four pneumatic ferries. The wind was from the south-east and hence favorable. It was a clear, starry night. At 3:40 AM, in the pale dawn, the attack was started without fire preparation by the division under W., and five minutes later by the division under R. with a short burst of fire from all weapons. The commander of the corps engineers who soon afterward was beside the river in Lutschenskij, observed the perfect way in which the crossing was succeeding and proposed to the division that the bridge equipment be brought up immediately. The attack from the old river bed east of the village was especially advantageous and the casualties here were scarcely worth mentioning. This only confirms experience, that the crossings should be as far as possible from wrecked bridges, former ferry sites, villages, etc., and in the open terrain.

An hour after the beginning of the attack, matters were less fortunate with the division at the strong point. To be sure, the casualties had been few in the Perepolnyj sector during the crossing of the assault boats and the building of the pneumatic ferry. But at Akimowskij, on the other hand, on account of very strong enemy fire, only parts of an infantry battalion had been able to cross and these were hard pressed on the opposite shore by a numerically superior enemy. On account of artillery, trench-martar, and machine-gun fire, all the assault boats and crews with one exception were put out of action, and it was necessary to stop the attack. Not until parts of an infantry regiment which had crossed at Perepolnyj had been sent south along the Don was it possible to start ferrying troops across (at 4:30 PM). It was for this same reason that terrain reconnaissance had been possible at Perepolnyj alone. To be sure, there were two sites here, but in one of them the floating equipment would either not have been sufficient or at most barely so, while in the other case the approach which had to be made across sandy, dune-covered terrain was too difficult. In spite of the fact, therefore, that the situation at Perepolnyj would have permitted the troops to begin the construction of the bridge at 5:30 AM, this advantage had to be waived and the decision to build at Akimowskij adhered to in spite of many doubts. At 6:30 PM, when the batteries and trains of W's division had already been rolling across the Lutschenskij bridge for an hour and a half, the engineer battalions under Le. and Pr. began the construction of the Akimowskij bridge, which was completed at 7:30 PM on 22 August. Both bridges, therefore, including their approaches, were finished in a surprisingly short time. Neither the corps general staff nor the high army command had counted on the work's being finished so soon. In connec-

tion with these feats we should consider the enemy's opposition both ground and air which at times was considerable, the weakness of the companies resulting from casualties, and the inadequate training of the main part of the reserves in river construction work.

In Akimowskij there were employed 19 trestle sections, 2 ramp sections, and 21 ponton sections; at Lutschenskij, 10 trestle sections, 2 ramp sections, and 26 ponton sections. The reserve material left on hand was quickly used up and a certain amount of equipment was destroyed during the following nights by numerous bombing attacks (sixty-two of them on the two bridges during the course of a single night!). The road construction battalion under Fr. and the bridge-building battalion under Cz. belonging to the corps reserves were employed in the construction of the approaches. About 700 meters (about 2,300 feet) of corduroy road was laid and there was some steel road material available. The road leading off the bridge and the shore across from Akimowskij were heavily mined and in addition there were 76 fixed flame throwers.

With the completion of the bridges, other use was made of the main part of the engineer forces. The following remained behind at the river, or were newly drawn from the corps reserves: the engineer regiment staff under V.; the engineer battalions under Pr. and Li.; and the bridge-construction battalion under Cz.

Their mission was to supervise the bridge service, protect the army bridges, collect and place attack equipment in order, reconnoiter for the trains, and construct emergency bridges.

With the crossing of the Don the decisive foundation work for the attack on Stalingrad was laid. Both thanks and recognition on the part of the army high command were expressed in a supplementary report, in which was recognized the excellent work of the engineers who under infantry and artillery fire had first ferried the attacking infantry across, then completed their army bridges ahead of schedule.

The attacks across the Don in August 1942 can be counted among the most glorious deeds of our engineers and will go down in the history of our arm of the service for ever.

Combat Reconnaissance In a Tank Engagement

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a Russian article in *Krasnaya Zvezda*.]

AMONG all the means and methods of studying the enemy fire system, particularly his system of antitank fire, an important role is played by correctly organized and constantly functioning tank combat reconnaissance. This method assumes particular importance in sharply irregular terrain where there are many natural places for concealment (woods, brushwood, ditches, etc.) which render it difficult and at times impossible to disclose the antitank defense system by the use of observation, raiding parties, and even air reconnaissance.

Besides this, as combat experiences have shown, enemy antitank guns and tanks, hiding in ambush seldom reveal themselves before our tanks make their appearance on the battlefield. This applies particularly to guns which are employed for point blank fire and which start firing only from very close distances, some times from not more than 80 to 100 meters.

For the purpose of accomplishing combat reconnaissance one echelon of tanks is dispatched forward from the main tank group. This echelon by its actions forces the enemy antitank guns concealed in an ambush to "speak up." Thus protection from unexpected fire is secured for the main group

of our tanks and enables us to execute our mission with the minimum losses in matériel.

Which tanks and how many of them should be sent into the combat reconnaissance echelon? Here there can be no pattern. Everything depends on the nature of the terrain and on the degree of strength of the enemy defensive position.

If the terrain is sharply irregular and the outer line of enemy resistance is well consolidated, the combat reconnaissance echelon should be composed mainly of heavy and in part of medium tanks. In those places, however, where the terrain is relatively even and the enemy outer line of resistance is comparatively weak, medium tanks should be employed because they are more maneuverable and at the same time have sufficient fire power. It is inadvisable to use light tanks for combat reconnaissance, especially during battle for the possession of the outer edge of the main line of resistance when the enemy antitank fire system is still unimpaired.

As experience shows, the combat reconnaissance tank echelon should be composed of a sufficient number of vehicles to enable them to proceed at intervals of 150 to 200 meters. Under these conditions each tank will see the next one clearly and will be able to give it timely fire support. In addition to this the combat reconnaissance echelon should partially cover the attack front of the main tank unit.

What should be the distance between this echelon and the main mass of tanks? It should proceed at a distance of visual contact, i.e. at 300 to 400 meters, so that the main mass of tanks will be able to provide timely fire support.

The combat reconnaissance party should be composed of tank crews who are skilled in efficient observation from the tanks and who are able to orient themselves well in the terrain. Before the engagement these crews should study, by means of thorough observation, the terrain in front to determine the concealed approaches to the outer defensive edge and places where the presence of enemy antitank guns is probable.

The combat reconnaissance echelon should move in a zig-zag in order to deny enemy antitank guns the possibility of firing at an easy target. Whenever possible all tanks should appear on the battlefield simultaneously in order to secure greater success of the operation.

The mission of the main mass of tanks is to provide timely fire support for the reconnaissance echelon. To this end it is necessary to divide the whole battlefield, as far as it is visible, into sectors of observation in accordance with clearly visible orienting points. Each tank of the combat reconnaissance echelon should be watched in its course by several tank crews of the main echelon proceeding in the rear.

Support by accompanying guns also will play an important role in such an operation. Let us quote an actual example. On one occasion as the combat reconnaissance echelon was passing certain woods it was surprised by the fire of an antitank gun. This gun went into position as soon as our artillery fire was transferred to the rear. The gun was well camouflaged. It is but natural that this gun was in a good position to inflict losses to the reconnaissance echelon which was passing nearby next to the main group of tanks. But these woods were being carefully observed by the commander of one of the accompanying guns. He noticed in time where this enemy gun was stationed and disabled it and its crew. The enemy gun fired only three rounds.

Incidentally, this example clearly shows that besides observation of the reconnaissance echelon by tanks of the main group, it is necessary in advance to organize ground reconnaissance from special artillery OP's.

To artillery of all types, and particularly to accompanying guns, there should be assigned the mission to open immediate fire at the request of tanks of the reconnaissance echelon (it is necessary to develop a system of special signals calling for fire and for target indication by each tank individually), as well as on the basis of their own observation. This same task should also be assigned to infantry fire agencies (machine guns and mortars of all calibers). Well organized fire support for the combat tank reconnaissance makes it possible to reveal the enemy antitank system with the minimum losses.

As the engagement develops in depth of the defensive position, and when it becomes necessary to liquidate individual centers of resistance and to fire against approaching enemy reserves, it will seldom be necessary to employ tank combat reconnaissance. In such cases tanks forming this echelon will be engaged with their units or with the normal reconnaissance agencies.

An unfamiliar word should be shunned like a rock.

—Julius Caesar.

Book Reviews

SPIES AND SABOTEURS

By WILL IRWIN & THOMAS M. JOHNSON
227 pages . . . W. W. Norton & Co.,
Inc., New York.

In a popular and engaging fashion the authors take the reader through the intricacies of military intelligence and its use in modern war. Claiming to base their material on information received from competent authorities who for obvious reasons must remain anonymous, Messrs. Irwin and Johnson manage to produce very readable chapters on the nature of contemporary espionage, methods employed by the spy, the espionage question in America today, and measures against enemy spying; i.e., counter-espionage, as well as the spies' allied weapon—sabotage. There is an interesting account of how our Army and Navy intelligence services operate. An appeal to the citizen on how he can prevent information from reaching enemy agents concludes the book.

Although the book as a whole definitely belongs in the "light reading" class, the authors deserve credit for bringing before the public the danger of enemy subversive activity. The authors are skilled writers, Mr. Johnson having previously written about the American secret service in World War I, and Mr. Irwin being a well known war correspondent.

FIELD ARTILLERY—BASIC

1506 pages . . . The Military Service
Publishing Co., Harrisburg, Pa.

By publishing this large volume the publishers have performed a meritorious service in organizing into one book the fundamental facts about Field Artillery. Battery and noncommissioned officers will find it most useful.

The work consists of two volumes bound into one. The first volume devotes considerable space to orienting the reader in American military history and tradition, military policy of the United States, and the background of the present war. The reader is then taken through an elementary course of military courtesy and discipline, sanitation and first aid, and military organization—administrative and tactical. There are chapters on the principles of leadership, the history and development of artillery, map reading, physical training, dismounted drill, ceremonies, standards and guidons, interior guard duty, and individual equipment and tent pitching.

Gradually, the reader is taken into Field Artillery proper, to which he is introduced through a chapter on the elementary principles of ballistics. This is followed by detailed text on the service of the piece in which the various types of Field Artillery matériel and ammunition are discussed. A chapter on the military organization of Field Artillery completes the first volume.

The second volume is devoted to an advanced course in leadership, fire control instruments, battery communications, the duties of the battery commander's detail, the care of animals and stable management, equitation, driving and draft, mounted formation and maneuvers for truck and horse-drawn battery, bat-

alion, regiment, and brigade, and the care and operation of motor vehicles.

At the end of each chapter there is a list of questions enabling one to examine himself on the knowledge gained.

"Field Artillery—Basic" will be found most useful both as reference and training text.

In this connection the following publications by the same company cover their respective fields in a manner similar to the one described above: *Tactics and Technique of Infantry*, Advanced (1939), and *Tactics and Technique of Cavalry*, Basic and Advanced (1939).

HOW TO PREPARE FOR MILITARY FITNESS

By LT. COL. FRANCOIS D'ELISCU
216 pages . . . W. W. Norton & Co.,
Inc., New York.

Coming at a time when thousands of American youths are being inducted into the armed services, Colonel D'Eliscu's volume should prove of real interest and help to officer and noncommissioned personnel concerned with the physical training and conditioning of our forces.

Colonel D'Eliscu was, until recently, head of the Ranger and Combat School. In civilian life he has trained Olympic swimming teams and was National Vice President of the Amateur Athletic Union of the United States as well as National Field Commissioner of the Boy Scouts of America. He is now serving with the United States forces overseas.

The book, which is richly illustrated and written in easily readable style, covers a wide range of subjects. First, physical tests are taken up, with special emphasis on Army standards of fitness. Then there are several chapters on calisthenics and conditioning exercises, alertness, tumbling, wall scaling and tree climbing, wartime boxing, judo, unarmed defense and disarming, wartime swimming, and lifesaving, etc.

THE AIR DEFENSE OF BRITAIN

By AIR COMMODORE L.E.O. CHARLTON,
G. T. GARRATT, AND
LT. COMMANDER R. FLETCHER.
224 pages . . . Penguin Books Ltd.,
Harmondsworth, Middlesex, England.

This volume consists of three distinct parts: Part I, The New Factor in Warfare; Part II, Air Raid Precautions; and Part III, Britain's Air Strength.

The first part describes air combat tactics, both offensive and defensive, and discusses strategical aspects of Great Britain and Germany in aerial warfare.

The Mediterranean air war situation is also examined. The second part is devoted to air attacks on civilian population, and the problems of the protection and evacuation of civilians. The third part delves extensively into Great Britain's needs of air defense, the quality of British aircraft, questions of supply, aircraft industries, the labor problem as it affects aircraft production, and the significance of all these to the RAF.

WAR DISCOVERS ALASKA

By JOSEPH DRISCOLL
352 pages . . . J. B. Lippincott Com-
pany, New York.

Mr. Joseph Driscoll went to Alaska as correspondent of the New York *Herald Tribune*. He traveled extensively, interviewing officers concerned with the defense of the territory, as well as the Americans and natives living in that sparsely populated country. His report is at once interesting and instructive.

Mr. Driscoll makes thoughtful observations of our military and naval activities in Alaska, the building of the Alcan highway, the extension of other highways and the building of pipelines. He lays particular stress on the strategic importance of Alaska and pleads for the recognition of its potentialities for offensive operations against Japan.

This book will be read with profit by military personnel.

CRYPTOGRAPHY

By LAURENCE DWIGHT SMITH
164 pages . . . W. W. Norton & Co.,
Inc., New York.

This is a very interesting and useful volume for any member of the military service who has to do with codes and ciphers, who is preparing for work of this type, or who desires to learn the various known methods of encoding and decoding.

The author takes the reader through the fundamental principles of transposition and substitution ciphers and their ramifications. There are problems and answers which make the whole book of greater interest to the beginner.

RIOT CONTROL

By COLONEL STERLING A. WOOD
163 Pages . . . The Military Service
Publishing Co., Harrisburg, Pa.

This handy little volume combines the functions of a Training Manual and Field Manual in military operations to quell civil disturbances, disperse crowds and mobs, and restore law and order.

Freely illustrated with photographs, sketches, diagrams, and charts, the book is organized to describe weapons and use of gas for riot control, formations to be employed by various units to cope with different situations, programs of field and indoor training, and general tactical principles. There are nine illustrative problems: how to clear a mob from a public building, quelling a prison riot, capturing rioters in a barricaded house, preparing a highway ambush, and methods of street fighting, to mention a few.

The chapter on legal authority and responsibility of the commander of troops assigned to such operations contains the answers to many questions.

This book will be most valuable to commanders of state troops and Home Guard forces likely to be used on civil disorder duty.

Library Bulletin

BOOKS ADDED TO THE LIBRARY SINCE MAY 1943

ACADEMY OF POLITICAL SCIENCE:

- American Industry in a War of Machines.** (Proceedings of the Academy of Political Science, January 1942.)
Economic Nationalism, Trade Barriers and the War. (Proceedings of the Academy of Political Science, May 1940.)
Effect of War on America's Idle Men and Idle Money. (Proceedings of the Academy of Political Science, January 1940.)
Transportation in Wartime and the United Nations. (Proceedings of the Academy of Political Science, January 1943.)

AGETON, ARTHUR A.—The Naval Officer's Guide.

AMERICAN ACADEMY OF POLITICAL & SOCIAL SCIENCE:

- Administrative Regulation of Private Enterprise.** (The Annals, May 1942.)
Labor Relations and the War. (The Annals, November 1942.)
Minority Peoples in a Nation at War. (The Annals, September 1942.)
Organizing for Total War. (The Annals, March 1942.)
The Press in the Contemporary Scene. (The Annals, January 1942.)
Winning Both the War and the Peace. (The Annals, July 1942.)

American Journal of International Law. Nos. 1-4. Vol. 36. 1942.

ARMY INSTITUTE:

- Review Arithmetic. Practice Book 1.** Whole numbers and fractions.
Practice Book 2. Decimals, per cent and arithmetic in daily life.
Review Arithmetic. Decimals, per cent, and applications of arithmetic. Whole numbers and fractions.

BELDEN, JACK.—Retreat with Stilwell.

BROOKS, CHARLES F.—Why the Weather? Illustrates many phases of weather science.

CHARLTON, L.E.O., GARRATT, G. T., FLETCHER, R.—The Air Defense of Britain.

CONGRESS.—Congressional Record. 77th Congress, 2nd Session. Vol. 88. 78th Congress, 1st Session. Vol. 89. 1942-1943.

COX, CHARLES R.—Water Supply Control.

D'ELISCU, FRANCOIS.—How to Prepare for Military Fitness.

DRISCOLL, JOSEPH.—War Discovers Alaska. Observation by a newspaper correspondent.

EDELSTEIN, JULIUS C.—Alaska Comes of Age. A brief historical description.

de la FALAISE, HENRY.—Through Hell to Dunkirk. An eye-witness account.

Federal Register. Vol. 8. Nos. 1-41. 1943.

Federal Supplement. Vol. 47. 1943.

GREAT BRITAIN.—Coastal Command. The air ministry account of the part played by coastal command in the battle of the seas 1939-1942.

GREAT BRITAIN.—Front Line 1940-41. The official story of the civil defence of Britain.

HSU, SHUHSI.—An Introduction to Sino-Foreign Relations.

HSU, SHUHSI.—Japan and the Third Powers.

HUTCHINS, R. M.—Education for Freedom.

INFANTRY JOURNAL.—How to Shoot the U.S. Army Rifle. A graphic handbook on correct shooting.

INFANTRY SCHOOL.—Mailing List. Vol. XXV. February 1943.

ITALIAN WAR MINISTRY.—Instructions Concerning Military Training in Mountain (Alpine) Warfare.

KERNAN, W. F.—We can Win this War.

MICHALIK, MAJOR JULIAN.—The Destruction of Warsaw.

PALMER, M. B.—We Fight With Merchant Ships.

PEATTIE, RODERICK.—How to Read Military Maps.

Railway Engineering and Maintenance Cyclopaedia.

REDMOND, LIEUT. JUANITA.—I Served on Bataan. Experiences of an army nurse.

SMITH, LAURENCE D.—Cryptography. The science of secret writing.

WAR DEPARTMENT:

- Annual Report. Services of Supply.** Fiscal year ending June 30, 1942.
German Military Symbols. 1943.
Notes For Task Force Commands in Pacific Theaters.
Special Orders. 1942.

WELLER, GEORGE.—Singapore is Silent. An eye-witness account of the fall of Singapore.

WILLKIE, WENDELL L.—One World.

World Almanac. 1942.

ZANUCK, DARRYL F.—Tunis Expedition.

Subject Index

LIST OF PERIODICALS INDEXED AND KEY TO ABBREVIATIONS

With the change in publication of the Military Review from a quarterly to a monthly basis, Main Articles and Foreign Military Digests will henceforth be listed in the Subject Index of the issue following their publication.

Aero = Aeroplane (Great Britain)
Air Force = Air Force
A Den Bul = Army Dental Bulletin
A Ord = Army Ordnance
A Quar = Army Quarterly (Great Britain)
Art Rund = Artilleristische Rundschau (Germany)
Chem War Bul = Chemical Warfare Bulletin
Chem News Let = Chemical Warfare Service News Letter
An Cos = An Cosantoir (Eire)
FA Jour = Field Artillery Journal
Ftg Forc = Fighting Forces (Great Britain)
Inf Jour = Infantry Journal
Jour RAMC = Journal of the Royal Army Medical Corps (Great Britain)
Jour R Art = Journal of the Royal Artillery (Great Britain)
Kras = Krasnaya Zvezda (U.S.S.R.)
Lumber Industry Mag = Lumber Industry Magazine (U.S.S.R.)
MC Gaz = Marine Corps Gazette
Mil-Woch = Militär-Wochenblatt (Germany)

Mil Eng = Military Engineer
Mil Surg = Military Surgeon
Nav Inst Proc = Naval Institute Proceedings
Our Army = Our Army
Panzer = Die Panzertruppe (Germany)
QM Rev = Quartermaster Review
Rev Mil = Revista Militar (Argentina)
Rev Mil Bras = Revista Militar Brasileira (Brazil)
RAF Quar = Royal Air Force Quarterly (Great Britain)
Tank = The Tank (Great Britain)
Ws & Wr = Wissen und Wehr (Germany)

Cos = Cosmopolitan
Cur His = Current History
Esq = Esquire
Fortune = Fortune
Harper's = Harper's Magazine
Lib = Liberty
Life = Life
Nat Geog = National Geographic Magazine
Newsweek = Newsweek
Reader's Dig = Reader's Digest
Sat Eve Post = Saturday Evening Post
U.S. News = United States News

GENERAL

Amer Leg = American Legion Magazine
Amer Mer = American Mercury
A & A = Asia and the Americas
Collier's = Collier's
Coronet = Coronet

Jan = January
Feb = February
Mar = March
Apr = April
May = May
Jun = June
Jul = July
Aug = August
Sep = September
Oct = October
Nov = November
Dec = December

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Americans in Tunisia learn war. (Life—26 Apr 1943)
Jeep of all trades. (Collier's—22 May 1943)
Scouting party. (Sat Eve Post—24 Apr 1943)
Secret mission to North Africa. (Reader's Dig—May 1943)

We fought both Nips and Nazis. (Air Force—May 1943)

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General Spaatz. (Life—19 Apr 1943)
Organization of the army air forces. (Air Force—May 1943)
The silent partner in the AAF. [See Main Article Section, Mil Rev—Jun 1943]

Theory and practice of the army air forces reorganization. (Air Force—May 1943)

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Airborne tactics. (Inf Jour—May 1943)
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Application of air transport to problems of supply. [See Main Article Section, Mil Rev—Jun 1943]
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 Ground services of military aviation. (Rev Mil—Oct 1942)
 Here's your horsepower. (Collier's—1 May 1943)
 How a dive bomber is tested. (Rev Mil Bras—Apr—Jun 1942)
 How we can help China fight. (Collier's—15 May 1943)
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Airdromes overseas. (Mil Eng—May 1943)
 Defense of an airdrome. (MC Gaz—May-Jun 1943)

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The aero-amphibious phase of the present war. (Nav Inst Proc—May 1943)
 Can we beat the U-Boat? Showdown near in Mid-Atlantic. (U.S. News—30 Apr 1943)
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 The Luftwaffe. (MC Gaz—May-Jun 1943)
 Result of air raid rivalry. (U.S. News—30 Apr 1943)
 Tokyo raid. (Life—3 May 1943)
 Tunisia: Meeting Hitler's best. (U.S. News—23 Apr 1943)
 Wanted: True air strategy. (Amer Mer—May 1943)

AIR RAIDS

I fight in the jungle. (Coronet—May 1943)
 Tokyo raid. (Life—3 May 1943)

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Application of air transport to problems of supply. [See Main Article Section, Mil Rev—Jun 1943]

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Aleutian patrol. (Cos—Jun 1943)
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Our new northwest passage. (Mil Eng—May 1943)
 These are the generals—Buckner. (Sat Eve Post—8 May 1943)

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Airdromes overseas. (Mil Eng—May 1943)
 Aleutian patrol. (Cos—Jun 1943)
 Remember Dutch Harbor. (Collier's—1, 8 May 1943)

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Playing for keeps—in training. (Amer Leg—May 1943)
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 Reinforcing artillery employed in mass. [See Main Article Section, Mil Rev—Jun 1943]

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Antiaircraft artillery with the division. [See Main Article Section, Mil Rev—Jun 1943]
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Defense of an airdrome. (MC Gaz—May-Jun 1943)
 Ground communications by an air unit. (Inf Jour—May 1943)

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Action against enemy antitank artillery. (Kras) [See "Foreign Military Digests" Section, Mil Rev—Jun 1943]
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 Russian tank and antitank tactics. (MC Gaz—May-Jun 1943)

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Action against enemy antitank artillery. (Kras) [See "Foreign Military Digests" Section, Mil Rev—Jun 1943]
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 Survey in tropical island warfare. (FA Jour—May 1943)

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Australia and New Zealand's place in the British-American military policies in the Pacific area. [Ws & Wr—Dec 1942]
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Wartime medical miracles. (Lib—1 May 1943)

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Counteraction against turning and flanking movements in the mountains. (Kras) [See "Foreign Military Digests" Section, Mil Rev—Jun 1943]

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Gen. H.H. Arnold,
Army Air Forces,
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